

How do we know?

How have we come to know all that we do at this point in our lives? Regardless of where on the planet we live and regardless of all the influences upon us, we gain our knowledge as human beings in similar ways. In TOK we will look more closely at four particular ways: sense perception, language, emotion, and reasoning. Although these four may not be the only ones, and although we do not use them separately from each other, we will try to disentangle them to give each one some special attention for how it contributes to our knowledge.

Four ways of knowing

How do you know it's raining? Suppose that you hear a spattering start on the roof. You also hear a distant rumble, and as you step outdoors to bring your bicycle under shelter you see a bright flash against the dark sky. Suddenly you feel wet splashes against your skin and very quickly the sodden clinging of your shirt. In this case quite clearly your senses "told" you that it is raining as you felt and recognized sensations. Often we know through **sense perception**: by referring to information gained by using our five senses—sight, sound, smell, touch, and taste. Although our senses have many limitations, as you will see when you do some of the activities in this chapter, they are a "window on the world", because we gain so much knowledge through them. Some would add that they constitute an important part of our makeup as human creators, as chefs and food lovers, swimmers and sports fans would attest. Our senses and the technologies we have invented to extend them play a role in how we gain knowledge in all disciplines.

How else might we know that it is raining? From another room, you hear your father call, "It's starting to rain. Would you please bring in the bicycles and the patio chairs?" In that simple call, using **language**, he reported his own conclusion based on his own sense perception and he set you in motion to act in a particular way. Reporting and giving instructions are only two of the many things we do with language, to the point that it is hard to imagine what life would be like without it—without the conversations, the stories, the information archived for ready access. In one way or another, language is involved in most of the knowledge you have gained from others, from the cultural knowledge passed to you by family to the information you gathered from books, and it significantly influences your other ways of knowing. Like perception, language has its limitations and even deceptions, but is so crucial to knowledge that some consider it essential even to a definition of knowledge.

Just as perception and language both give us ways of knowing that it is raining, so **emotion**, too, can give us knowledge, sometimes so swiftly that we are unaware of the process. The lightning and thunder, perceived through our senses, may provoke fear and an instant search for shelter, in a way similar to the sight of a scorpion

prompting us into a protective recoil. Emotion can be a way of knowing that is private and deeply personal, and which affects knowing other human beings. Through emotional sensitivity we may understand that something is wrong with a friend even though she has not said a word, or respond empathically to a photograph on the front page of a newspaper. More than any of the other ways of knowing, emotion has had its flaws emphasized by individuals, historical epochs, and cultures. However, emotions provide us with an avenue to knowing ideas, people, and situations, and modern scientific findings even indicate that emotions are essential to reasoning.¹

Sometimes placed in opposition to emotion as a way of knowing is reasoning, though like the other ways it has its strengths and limitations. When the rain starts, why do you go outdoors to bring in the furniture and bicycles? From past experiences, you have generalized (and so has your father) that objects left out in the rain get wet. Through reasoning, you apply this general understanding to tonight's particular rainfall, and conclude that your own particular bicycle will get wet.

Reasoning comes so naturally to us that we may rarely stop to think about how we arrive at our conclusions. Yet reasoning is the way of knowing that allows us to reach sound conclusions, as well as convince others that our arguments are valid. As we will see, reasoning has limitations and can be applied carelessly, yet it interacts with the other ways to contribute powerfully to our knowledge.

Although for most of this chapter you will be invited to think about these four ways of knowing one at a time, in real life our experience is more complex and messy. Sense perception, language, reason, and emotion rarely operate on their own, and in part it is their combination and the sometimes conflicting information they provide that makes the pursuit of knowledge so fascinating.

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Sense perception

Contact with the world around us

In the most general of definitions, sense perception is the physical response of our senses to stimuli. Our senses include hearing, taste, touch, smell, and sight, for which we have sense receptors in different parts of our bodies. We also have internal physical receptors for awareness of our own bodily sensations, such as hunger, pain, and arousal.

Today the study of sense perception is largely the domain of psychology. In a very simplified fashion, the process of sense perception is three-fold. First, our sense receptors are stimulated by sensory information. The brain then translates that sensory information into sensations such as sound, taste, temperature, pressure, smell, or sight, for example. Finally, higher centres in the brain either ignore or recognize the sensations and their meanings, based on neuronal networks of past association and expectation.

We do not sense all the stimuli that we're potentially able to sense. There's too much going on in our environment for us to handle, and we unconsciously ignore many stimuli. Close your eyes and listen carefully to all the sounds around you, for one full minute. Which sounds had you not been aware of, prior to this exercise? Do the same by focusing your attention for

Sense contact with the world: some questions for reflection

A man sits at a table on a terrace overlooking the sea. There is a light breeze in the air and he feels the warmth of the sun on his skin. He is drinking orange juice and savouring the smell of his coffee, as he prepares toast with creamy unsalted butter and homemade strawberry jam. You are at a table nearby, reading your newspaper. When you look up a few minutes later, you notice he isn't moving. You learn that he has had what we could call a "sensory breakdown". First the smoky taste of the coffee disappeared and he could not tell if the liquid in his mouth was hot or cold. Then the cup fell away from his fingers and crashed to the ground, burning him on his leg—though he didn't feel it nor did he hear the sound of the china breaking. Within seconds he was overcome by silence and darkness.

Reading about the man's "sensory breakdown" often makes people feel uncomfortable or scared. Does it make you feel uncomfortable? If so, why?

Identify how each of the elements in the painting is



STOSKOPFF, Sébastien, *Summer or the Five Senses*, 1633. Oil on canvas, Musée de l'Oeuvre de Notre Dame, Strasbourg

connected to one or more of our senses. How do you think each of the elements might be appreciated to it fullest?

If you were forced to accept the loss of one of your five senses, which would you choose? Compare with other people's answers. Is there a general agreement over which sense people are willing to give up with the least resistance?

Choose one IB Diploma Programme subject, one sport and one job or profession. In what ways are your senses necessary for learning and becoming an expert in these domains?

one minute respectively on: (a) the smells around you, (b) the feelings your body is experiencing such as the pressure of your hands holding this book, and (c) the images in your environment. Which ones had you not been paying attention to before?

Now let's try to bring all our senses together. Imagine you're walking by yourself in a dark alley, and suddenly become aware that you have company. You feel a surge of adrenaline. What sensations might you have experienced that would have allowed you to recognize danger in that situation?

The word "perception" can be ambiguous, however, because its common use includes our entire understanding of something, including our opinions. We speak of "perceiving" an experience as being desirable or dangerous, even though we are not receiving a value such as "desirable" through our senses. Very often we use the word "perception" as roughly equivalent to our conception of (or idea about) something. It may be difficult in any case to separate physical perception from our whole understanding. However, attempting to restrict our attention to sense perception will be helpful. It will make us more aware of the interplay of perception and conception, and how they come together to shape the pursuit and justification of knowledge.

The painting and the scene described in the “Sense contact with the world” box might illustrate why it is said that our five senses are like threads that connect us to our inner selves and, crucially, to the world outside ourselves. Much of what we learn, remember, believe, and know depends on our senses. Many of us might even wonder to what extent the man who suffered the sensory breakdown is truly alive.

The range of human senses

By definition, every sentient creature has receptors that capture a certain kind and range of stimuli from the external environment. Other animals have senses we do not share: for example, bats and dolphins use sonar for navigation, and homing pigeons and sockeye salmon have deposits of magnetite in their bodies that enable them to detect the Earth’s magnetic field to find their way home. Even the senses that we do share with other animals, we possess to different degrees: we don’t smell as keenly as wolves, or see as well as eagles.

Knowing how other animals gain sensory information makes us aware of our own specifically human perception of the world, a world that most people assume to exist outside themselves. We are not perceiving the world as it is, in the only way it can be perceived. We are sensing in a human way, and building our knowledge from a limited range of all the sensory possibilities of all the species on this planet.



How does the world appear to be to him? How might he sense you?

With your class, do some research and use your imagination to explore beyond our human range

- 1 Find out, alone or in a small group, as much as you can about animal senses unlike our own. Some suggestions: the lateral line system of fish for sensing pressure, echolocation and barometric sensitivity of bats, use of tongue by snakes for smell and taste and their sensitivity to vibration, electrosensing of sharks, chemoreceptors on the entire bodies of earthworms, compound eyes of insects.²
- 2 Drawing on the information you gained about other species, choose any one and be prepared to enter imaginatively into the sensory world it inhabits. Without revealing your choice to others in your group, take 15 to 20 minutes to write a description of your classroom as if you are this animal. (Imagine that your classroom is underwater if necessary!) When finished, volunteer to read your description if you feel comfortable doing so. While someone else is reading a description, take note of the number of times the description involves each of the senses. At the end, try to guess what animal’s sensory world is being described.

These activities encourage awareness that we are at the centre of our own knowledge not only as people with different experiences and cultural backgrounds, but even more basically, all together as a species. We use perception as a way of knowing with all the strengths and restrictions specific to human beings.

Not only are our sense receptors and sensations particularly human, but our interpretation of sensations is likewise dependent on our brains. It seems to us, as we see the pink roses or taste the sweet honey, that the pinkness and sweetness are in the roses and honey rather than in their effect upon us. Yet our conscious experiences of honey are the product of the electrical and chemical organization of

Observe the descriptions of smells and textures in this extract from Virginia Woolf's *Flush: A Biography* (1933).³ Often described as a biography of Elizabeth

Barrett Browning from the point of view of her dog, some may think it is in fact the biography of this spaniel himself.

...it was in the world of smell that Flush mostly lived. Love was chiefly smell; form and colour were smell; music and architecture, law, politics and science were smell. To him religion itself was smell... Flush wandered off into the streets of Florence to enjoy the rapture of smell. He threaded his path through main streets and back streets, through squares and alleys, by smell. He nosed his way from smell to smell; the rough, the smooth, the dark, the golden. He went in and out, up and down, where they beat brass, where they bake bread, where the women sit combing their hair, where the bird-cages are piled high on the causeway, where the wine spills itself in dark red stains on the pavement, where leather smells and harness and garlic, where cloth is beaten, where vine leaves tremble, where men sit and drink and spit and dice—he ran in and out, always with his nose to the ground, drinking in the essence; or with his nose in the air vibrating with the aroma. He slept in this hot patch of sun—how sun made the stone reek! He sought that tunnel of shade—how acid shade made the stone smell! He devoured whole bunches of ripe grapes largely because of their purple smell; he chewed and spat out whatever tough relic of goat or macaroni the Italian housewife had thrown from the balcony—goat and macaroni were raucous smells, crimson smells. He followed the swooning sweetness of incense into the violet intricacies of dark cathedrals; and, sniffing, tried to lap the gold on the window-stained tomb. Nor was his sense of touch much less acute. He knew Florence in its marmoreal smoothness and in its gritty and cobbled roughness. Hoary folds of drapery, smooth fingers and feet of stone received the lick of his tongue, the quiver of his shivering snout. Upon the infinitely sensitive pads of his feet he took the clear stamp of proud Latin inscriptions. In short, he knew Florence as no human being has ever known it; as Ruskin never knew it or George Eliot either. He knew it as only the dumb know. Not a single one of his myriad sensations ever submitted itself to the deformity of words.

our brains. "Our conscious world," declares one biopsychologist, "is a grand illusion!"⁴

The table at the top of the following page summarizes how we translate external stimuli into sensations, and how we might describe them.

Some technological extensions

Technology gives us access to knowledge of the world beyond that which our senses allow us. Instruments such as telescopes and microscopes extend our senses by allowing us to see distant and small objects that reflect visible light. More recent technologies enable us to go beyond the range of what we can sense naturally,

Human sense perception			
Stimuli	Sense receptors	Sensation	Response (example of meaning attributed)
Electromagnetic energy (EM) between approximately 400 nm and 700 nm	Eyes, retina	Light and colour EM radiation shining on an object results in visual perception.	"That's my cat."
Vibrations or waves with a frequency between 20 and 20,000 Hz	Ear, auditory nerve	Sound The presence of certain frequencies results in auditory perception.	"That's our national anthem they're playing."
Odour molecules	Nose, olfactory receptor neurons	Smell The presence of a certain combination of molecules results in the perception of smell.	"Freshly baked oatmeal cookies!"
Chemical composition	Mouth, taste buds, chemoreceptor cells	Sweet, salty, sour, and bitter The presence of a certain composition results in taste.	"This dark chocolate is bittersweet."
Pressure, temperature	Skin, nerve endings	Hot, cold, textures, pressure, pain These stimuli result in touch.	"The coffee is very hot."

vastly extending the range of phenomena we can perceive. Consider the devices listed below, and the things they enable us to detect. On which of our five senses do they rely to enable us to use them? How many other technological extensions can you add to this table?

An interesting question, to be explored when we discuss the natural sciences, is how we can know that we are detecting, through these devices, what we think we are detecting. Our awareness of the limitations of human sense perception has acted as a spur toward trying to overcome them. Bats have a natural sonar. Many animals can see at night. Not so endowed, human beings have compensated by developing knowledge.

Technological extensions		
Device	What can be detected	Relies on which sense?
Night-vision detectors	Infrared radiation	Vision
Geiger counters	Radiation (alpha, beta, gamma)	Sound, vision
X-ray machines	X-rays	
Video cameras	Processes too fast or too slow for our eyes to perceive	
Radio telescopes	Radio waves	
Microphones	Sounds at very low volume	
Ultrasound devices	Sounds at very high frequencies	
Sonar equipment	Sounds at very low frequencies	
Smoke detectors	Tiny smoke particles produced during burning	
Litmus paper	Acidity	
Sensitive scales	Very small weights	
Compasses, magnetometers	Magnetic fields	
Electrometers	Electric fields	
Thermometers	Temperatures beyond the range humans can survive in	
Ammeters	Electric currents	

Individual variability of human senses

Sense perception varies not just from species to species, but also from person to person within our species. Some people suffer from a neurological condition called synesthesia, and can "smell" colours and

"feel" tastes. Some people, such as acclaimed wine tasters and perfume makers, also have extraordinary capabilities to sense certain things. The story of Cristina Frías (see box) illustrates how other senses can be enhanced to compensate for one that is lacking.

Explore the following questions:

- 1 How can you tell if your ability to perceive is in the "normal" range? How is that norm defined?
- 2 How do you know that what you call "red" is what your classmate calls "red"? Assume that neither of you is colour blind.
- 3 Recall how, as a child, you learned the names of colours and tastes. If you and your classmate are not colour blind, does it really matter if you use the word "red" for slightly different sensations?
- 4 If you are interested, do some research on the language wine tasters use to describe different wines. How can you come to understand what they mean by those terms?
- 5 Does it seem to you that you perceive things other people cannot, such as details of plant leaves or insects, details of automobiles, or subtle elements of football play? Can others perceive things you cannot? How would you explain the differences? Can these be changed, say if you took an interest in a field that's currently not important to you?

Sensory information and interpretation

Taking in information through our senses is only part of sense perception, however. That information travels to our brain, which makes sense of the stimuli. Even when we are not consciously aware of interpreting our perceptions, our brains are actively engaged in doing so.

Look at the pictures on the right and first ask yourself the question "what do I see?" Once you have answered, ask yourself what is "really there" in the image.



Now, read the text below. Can you read it? Is it English?

I cdnoulbt blveiee taht I cluod aulacty uesdnatnrd waht I was rdanieg. The phaonmneal pweor of the hmuan mnid! Aoccdmrig to a rscheearch at Cmabrigde Uinervitisy, it deosn't mttae in waht oredr the ltteers in a wrod are, the only iprmoatnt tihng is taht the frist and lsat ltteer be in the rghit pclae. The rset can be a taotl mses and you can sitll raed it wouthit a porbelm. Tihs is bcuseae the huamn mnid deos not raed evey lteter by istlef, but the wrod as a wlohe. Amzanig huh? Yaeh and I awlyas thought slpeling was ipmorantt.

Our brains translate stimuli into sensations such as images, temperature, colours, and sounds, which are meaningless without a further step. Imagine that you didn't know English. Do you think you'd have been able to understand any part of the text above?

Cristina Frías worked as counsellor in a school in Santiago, Chile, attended by about 1800 students. Generations of alumni remember her well: she had a beautiful Labrador guide dog – clearly the only canine on the school premises and, rain or shine, Cristina walked to and from school to her house in the neighbourhood. But first and foremost Cristina is renowned to generations of teachers and students because despite being blind since childhood, she had an uncanny ability to identify individual people. She would cheerfully call out, "Good morning, so-and-so!" even if one tried to pass unnoticed. When asked how she accomplished what seemed to many of us to be quite a feat, she said she recognized individuals by how we walked up stairs and down corridors, by our unique odours and the ways we knocked (or didn't!) on her office door when it was shut.



The text can be understood by native English speakers because repeated encounters with the correctly spelled words generated neuronal networks in their brains. Stimuli are not being processed by your brain as if it were a blank slate. Rather, the resulting sensations are being integrated, compared, and contrasted with everything you've perceived before. This kind of seemingly simple and involuntary filling in of missing information to form a recognizable pattern or interpretation was what generated the lines and figures in the examples above.

According to the Gestalt theory of psychology, we tend to perceive objects visually as meaningful patterns or groups, rather than as collections of separate parts. When you look at your teacher, you recognize her face immediately without being aware of all its separate components. If your recollection of the first picture above is a square with concentric circles on each angle, you've followed the principles of Gestalt. The picture is actually constituted of four groups of four concentric 270 degree arcs, placed at 90 degrees to each other. There is no square there, and there are no circles there. We tend to simplify visual information, grouping it in patterns that are easier to process. It works quite well for us, except that sometimes we tend to recall what's not there.

Mirages and optical illusions, too, bring to our attention how quickly and unconsciously we interpret, and how easily our senses can be fooled. If you are interested in exploring optical illusions, many are available in books or on websites, circulated, like the misspelled sentence above, so widely that their original source becomes lost. Their popularity, like the popularity of magic shows, suggests that we often enjoy being tricked when we have consented to be so.

The fact that our brains interpret new stimuli based on past experiences is critical to our being able to use perception as a way of knowing. As you approach the door of your house, you recognize it, even if it is standing open at an unusual angle, one at which it has never exactly stood before. As you approach a door you have never seen before, you do not stop in confusion, but open it and go in. You have associated and grouped your experiences of doors of the past: you have learned. If we perceived every new sensation as a unique experience, without any associations from the past, we would not be able to act in the world, and probably not survive in it either.

We expect perception to provide quick recognition and to fill the gaps. As your friend passes quickly in the distance, you recognize him with very little sensory information: you have noted instantly the characteristic way of walking, caught a quick flash of a familiar coat, or heard his laugh. As your friend calls you on a telephone with a poor connection, you can still understand (up to a point) what she is saying, despite words being cut out by static or seconds of silence. In 2005, *New Scientist* published an article about Esref Armagan, a man who has never been able to see, yet who can paint sophisticated pictures that all can recognize. This suggests that we interpret stimuli and create mental images in very complex ways.⁵

Perception completely free of interpretation may appear to be an ideal as we gain our knowledge, but it is humanly impossible.

Moreover, is it truly an ideal? This question will recur in the TOK course as we consider the interaction of different ways of knowing, the creation of different areas of knowledge and, in all areas of knowledge, the interplay between the eye and the mind—between our perceptions and our conceptions.

Perception and selection

What we perceive out of all the “sense noise” of the environment depends on a host of factors about the object of perception, the person who is perceiving, and the context in which the perception is taking place. Many factors influence what we perceive and remember: out of all possible sense observations that we might make, we catch only a few, and out of all that we might remember, we recall even fewer. Perception is a selective process.

To give some attention to your own process of perception, try one or two class exercises, followed by discussion.

Group exercises

Perception in the present

Choose in advance someone to prepare an object for observation. It could be an object with considerable detail found anywhere in the school or at home, or it could be an object made by the appointed person. All members of the group should sit in a circle, eyes closed, while the person places the object in the centre. When told to do so, everyone should open their eyes, observe the object, and then make a record of their perceptions on a sheet of paper either in words or in drawing. When everyone is ready, place your papers around the object in the centre so that all of you can see all the different records.

- How can you check your own record to determine whether it is accurate?
- In what ways do your different records of perception vary, and why? Pin down as many reasons as you can.
- Is it possible to separate sense perception entirely from interpretation in the records that you have made?
- What are the recording methods used by different students? Is any method particularly effective, in the judgment of your group?
- If all the different records by all members of your group are combined, do you then have a better record of the object? Why or why not? If all are combined, is the record complete?

Perception in the past

Choose together something within your school that all students in the class could have had access to within the past day or two, even if they did not give it close attention. Choose something with abundant detail that could have been observed. It could be, for example, a school notice board or web page that regularly updates notices, or a school play, dance, or sports event.

- Impose a time limit of roughly 5 minutes, in which everyone is to write down, as swiftly as possible, as many observations as possible made with the senses. What were all the notices on the board? Or what were the key observations of the sports event?
- Compare your lists and descriptions. What influenced what each of you noticed and remembered?

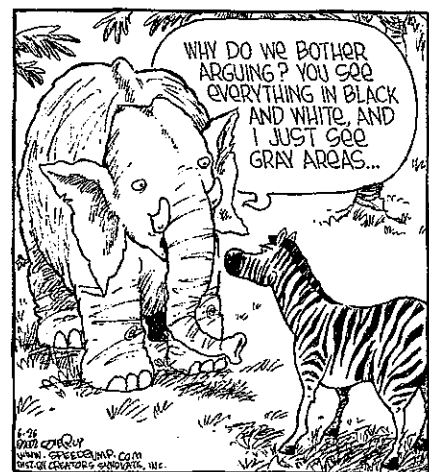
- In spite of personal variability, are some observations simply wrong? How do you know?
- If your records are combined, do you have a better record? If your answer to this question is yes, explain what you mean by "a better record".

"Seeing," we often hear, "is believing." We tend to be convinced by our own first-hand observations (though perhaps with more awareness of possible selection or error if we have reflected on the limitations and interpretations of the senses). Outside a court of law, eyewitness reporting similarly carries a stamp of credibility. "I know someone who was actually there, and he told me..." However, even when their senses are functioning perfectly well, and even with the strongest of intentions to tell the truth, witnesses may vary considerably in their accounts of an event. Indeed, all may tell the truth, and still not give the same account because of all the factors which influenced what they selected, consciously or unconsciously.

Some striking stories are told of expectation as a particularly strong influence upon perception. A group of medical students, told to listen closely to the opening and closing sounds of a patient's heart valve, succeeded in hearing it. Their instructor then revealed that their stethoscopes were stuffed with cotton wool and inoperative. Their lesson was not on the valve of the heart, but on the need to be on guard against imagining hearing what they expected to hear, and against reporting what they thought the rest of the group heard and the instructor expected them to hear. This story may ring true to any student doing a lab who is helped considerably by knowing in advance what the results are supposed to be. It may also sound familiar to anyone knowing the story of the emperor's new clothes.

A similar account is made of the explorer Columbus, setting out from Spain in 1492, and expecting to encounter the humanoid monsters who were believed to live beyond the limits of the known world. The Native Americans he actually met clearly did not fit his expectations, so he gave their appearance considerable attention in his records. Yet he persisted in his inquiries about humanoid monsters, and recorded reports that seemed to fit, for example descriptions of human beings with tails. "The tales to which Columbus paid attention, and the manner in which he interpreted them, undoubtedly reflected both his expectations and his hopes. The poor communication between Columbus and the Indians...gave him considerable leeway in imposing his own meanings on the Indians' stories."⁶ In listening for stories of monsters and even seeking them out, Columbus was not particularly foolish. He was merely responding in context of the beliefs of his culture and historical time.

What we perceive, ultimately, is much affected not just by what is there but by who we are, biologically, personally, and culturally. Perhaps, metaphorically, the zebra will always tend to see in black and white and the elephant will always tend to see in grey. Who, after all, is doing the perceiving? Who, once again, is in the centre?



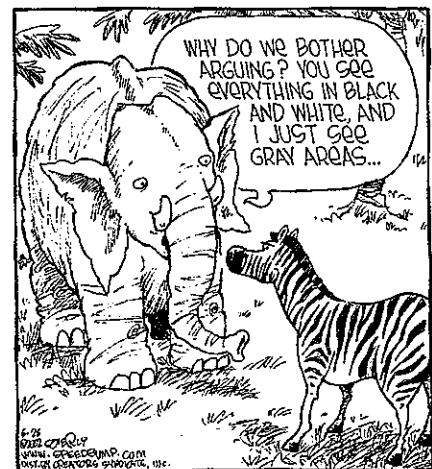
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Cultural conceptions of the cow

Shobha Lalwani, Barbados

As a Hindu, I've grown up seeing the cow as a mother. A cow gives us milk to nourish the population, and holds an honoured place in society. You would never do anything to hurt a cow any more than you would hurt your mother. If you see a cow roaming the streets alone, you wouldn't honk your horn or overtake it but drive behind it and be respectful. I wouldn't eat beef or any other meat either. I'm completely vegetarian.



Christy Drever, Alberta, Canada

When I see a cow, I see meat first thing but I also immediately recognize several breeds. Some people think that Angus meat is the best, but others prefer Charolais. I would never become vegetarian because that would be a slap in the face of my family. Cows are our staple food and our income, but to me they also mean home and a whole lifestyle. We have about 1,000 cows of several breeds, and for me the cattle drives and calving are just part of normal life. I've sometimes come home from school to find a calf in our bathtub because if they're born when the temperature is -20°C , they'll freeze if they're not put in a warm bath. It's amazing that people don't know how to chase cows. I thought it was a natural thing.



Mading Ayuen Angeth, Sudan

The Dinka nation holds cows as an essential part of our daily life. They provide us with hides, leather, meat, and milk. A Dinka may wonder why Hindus regard cows as sacred animals that cannot be slaughtered. "Why would they keep cattle they wouldn't kill for meat? They obviously don't recognize the significance of cows!" A modern Sudanese living in a city, however, would think that "it is just a waste of time to spend so much time chasing after the beast day and night".



Timothy Hall, Yukon, Canada

At home, we consider beef a lower quality meat. Wild meat like caribou or moose is much higher quality. It's leaner. It's also got a more authentic feel because you didn't buy it in the store in a packet but you've earned it. You've



camped for days and walked around in the mountains, and you've skinned it, cut it up, and packed it out yourself. I don't enjoy seeing an animal die, but hunting season is a special time with my Dad and my brothers, hiking in the mountains.

Tanaka Lesedi Mhambi, Zimbabwe

In traditional Shona culture, cows were often a measure of wealth. It was common for cows to be used as payment of the bride price. Cows were sometimes dedicated to ancestors, in which case they would not be killed. Cows are used for their milk and meat, and oxen are usually used to draw carts or plough the fields.



Alvaro Ballarin Cabrera, Spain

We have a great tradition of bullfighting and the running of the bulls. The bull is a symbol of strength and power, so a symbol of Spain. The Iberian Peninsula even looks like the hide of a bull. Along the roads, you see a lot of giant cut-outs of bulls, but that's just advertising for a kind of wine.



Perception, conception, and the influence of culture

Do all of the students pictured here perceive cows and bulls in a similar way? Yes, they all use their senses and believe they do so within the normal range. Their sense perceptions of the animals are similar, but their conceptions—shaped by prior learning including cultural practices and beliefs—differ considerably.

Likewise, a dog might be conceived as a beloved pet to be treated as a member of the family, a guard dog or a sled dog to be treated as a working animal, an unclean animal to be kept out of a Muslim home, a sign in the Chinese zodiac with a story behind it, or an ingredient in a delicious dish that your mother makes.

What cultural attitude do we take, more broadly, to other living things? Should the life of an animal be given any of the same respect that is commonly attributed to human life in ethical discussion? A Canadian IB graduate, Carla Brown, tells of living in accommodation shared with three other students from different cultures. One of her roommates was about to step on a spider that had invaded their room when another roommate screamed and insisted on not killing it. "As a Buddhist, she felt that killing a creature was a terrible thing to do. She picked up a cup, gently swept the spider into it, and released it outside. And so it continued for the rest of our time together. Angela would spot an insect and Palm would busily scoop it up and set it free."

If you are interested in learning more about cultural perspectives on animals, you might start by investigating the lion or the spider. Attitudes toward animals can highlight the way in which we stand in the centre of our knowledge, with others from our cultural group, even in the most everyday of our perceptions. At the same time, the attitudes we adopt toward other creatures can lead to much more complex issues, such as the nature of human responsibility toward other living things and the environment. We will return to ethical ideas of responsibility in a later chapter.

The enigma of sense perception

Though scientists know more about our senses now than at any time in the past, human perception continues to be something of an enigma. It is fascinating that as humans we convert physical stimuli in the form of electromagnetic or other kinds of energy into meaningful objects and events. You hear not just noise, but the song you danced to the night you first fell in love; you see not just the sensation of light, colour, and shade, but your father who is waving to you as you step onto the station platform and into his familiar embrace.

The world is not as we sense it, but we do not know how it "really is". As we learn more about our own brains and as we see deep into the subatomic world with senses extended by technology, we gain further understanding that tells us, in some ways, how little we still know. Indeed, some philosophers have argued that we cannot know that the world even exists outside ourselves at all, as all we know is our sense impressions of it, and not the world itself. How we deal with this questioning of sense perception depends upon our goals in knowing.

As we will return to examine in more detail, different areas of our knowledge use perception in different ways. But look briefly ahead now, to consider the following questions. Please realize that attempting to answer any one of them in detail could require a lifetime of discussion!

- The sciences use perception in gaining knowledge, gathering observations with great care in order to converge in a common understanding of what the world (assuming that it exists outside our sense information of it) is really like. How does science seek to overcome individual or group variability in pursuit of truth?

Follow-up summary

You might want to compare the factors you and your classmates identified as affecting perception with the following list.

- *Characteristics of the object or incident under observation:* size, colour, shape, loudness, composition, distance away, familiarity or unusualness, length of time it can be seen or heard.
- *Characteristics of the observing conditions or context:* angle of observation, frequency of observation, quality of light, amount of background noise or other distractions, reactions of others drawing attention to or shying away from the object or incident.
- *Characteristics of the observer:* normality of the person's senses at the time, person's emotions, degree of interest in what is being observed, expectations, background knowledge.

- The arts use perception as a source for their more divergent work. How do the arts (literature, for instance, or music) use individual or group variability of perception as a strength?

Perception does not function by itself as a way of knowing, but is intertwined with language, emotion, and reasoning. In each of the areas above—the sciences and the arts—what do you consider at this point to be the particular balance and blend of the four ways of knowing?

Language

Like sense perception, language is a fascinating study in itself. In TOK, we give our attention to some of its particularly intriguing characteristics in considering it as a way of knowing. Before we do so, though, please gather some of the ideas you already have on this topic.

- What would you say, right from the outset, is the role of language in knowing? How does it influence what we know and how we know it?

Symbolic representation

No matter where we go in the world, people possess the amazing ability to make noises to each other with their mouths and convey this thing we call meaning. In many places, they also make marks on paper or other surfaces and expect others to be able to understand meaning from the marks. This capacity for language is a human characteristic, with children everywhere learning the language passed on to them by their own speech community, joining not just in mouth noise and marks on paper but also in communication. Language is so much part of our lives that its power can escape us: many of us may never wonder how language serves to give us knowledge and affect our understanding of the world and ourselves.

Much of the power of language is rooted in its symbolic nature, the use of sounds to stand for things or ideas with which they have no necessary connection, within a grammatical system that enables the symbols to be combined to connect ideas. How exactly language creates meaning eludes full understanding, though different theories suggest different ways: through the way our symbols refer to things and ideas, through the way they stir associations of ideas, or through the way they create the stimulus and response of language behaviour.⁷ Central, though, to all forms of symbolism is the use of one thing (an object, an image, a sound, a word, for example) to stand for something else.

How is this connection made? Some visual images may stand for very specific ideas and seem, to those familiar with them, quite clear and self-evident: the image of the man or woman on the door of the public toilet indicates who is expected to use the facilities; a road sign that pictures falling rocks indicates a form of danger. Even in such cases where the sign uses a picture, though, we are already removed from a self-evident or necessary connection between the picture and what it refers to. Placing an image of a woman on a door does not

communicate anything in itself; all we have is a door with something on it that we interpret as a picture of a woman. It may be no more than a decorated door. The meaning comes from the connection we have learned between that image and a particular cultural practice of indicating toilets and separating the sexes in their toilet usage.

The sign for falling rock, even though the picture shows the tumbling objects, possibly demands even more background familiarity. Those of us familiar with road signs read the shapes as rocks and a slope, the static image as motion, the triangular shape of the sign as a warning, and the specific warning as applying to driving conditions on a road. The sign exists within a system of road signs agreed on so that we do not actually have to decipher its meaning; we learn it. The relationship is a matter of convention—of agreed, accepted connection.



Symbolic representation

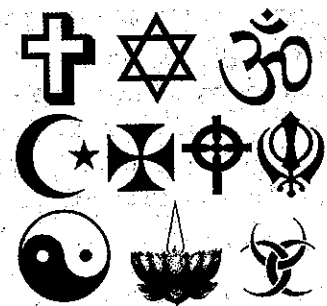
1 Think now of the variety of different kinds of connections between symbols and things symbolized that surround us as we communicate daily and observe communication around us. What distinctions would you draw between elements in the following list?

- a an animal danger sign, such as the flash of a deer's tail or the cry of a bird
- b a human danger sign, such as the warning for falling rocks
- c the word "danger"

A distinction is sometimes drawn between signs and symbols: those which are genetically inherited as a characteristic of the species, fixed in their meaning, and anchored in the immediate place and time are called "signs" (seemingly almost all animal communication) while those which are created

through convention are called "symbols". Human signs, invented and accepted by convention, are a subcategory of symbols. (In other usage, the way language works symbolically to create meaning is analysed as a system of signs in relationship with the objects or ideas to which they refer.)

- 2 What is the difference, in your view, between your sense perception of the bird we call a dove, an image of the dove with an olive branch in its beak, and the word "dove"? What characteristics of language do you note, in this context, as you read the sentence "He dove into the water"?
- 3 Consider these symbols associated with different religions or worldviews. How many of them are familiar to you? Is any of them significant to you in the context of your own



community? Could anyone outside your community, looking up or being told the meaning of the symbol, understand it as you do? If not, why not?

- 4 What does a flag symbolize? If, as we have said, the relationship between the flag and what it refers to is a matter of convention, which could easily be otherwise, why does waving a flag—or burning it—reflect and generate passion? In what ways is the action itself symbolic? Can you think of other examples of symbolic actions?

When the sign is not pictorial the connection becomes even more obviously a learned one. There is no necessary link between the tree of our sense perception and the word "tree", any more than between it and the word "arbre" in French, or any other sound we might generate. If we called that experience of sense perception a

It doesn't translate #1: influence of geography

As we look over the many different languages of the world, our attention may be drawn less to the similarities in the way all human beings use symbolic systems than to the differences. With words in one language not equating with words in another, the gulf at first may seem enormous.

Yet is it really very surprising that languages of the far north, with their vast horizon without a tree in sight, will not have words for mangoes and monkeys? Is it surprising that languages of the tropics will not abound in fine distinctions in snow conditions or types of bears? Such variations do not indicate that different groups of people use symbolism differently or are confined in their thought to a mango-free world; they do suggest that different groups open their eyes on very different geographical conditions.

The translation gulf grows with the effects of geography on the way people live in the world—their sources of food and shelter, for example, and all that follows in their cultures. A language may liken the ages of women to the stages of ripeness of a yam,

Mohamed Shakir, Maldives

In Dhivehi, which we speak in the Maldives, we have many words for coconuts or the coconut tree. There's a word for the coconut palm tree itself and another for its edible tip. There are several words for the stages of ripeness of the coconut, and others for the leaves, trunk, and roots. I think that's because we use the tree in so many different ways for food, building materials, fuel, or decoration.



or divide its society into eagle or wolf clans, since the natural environment influences particular categories and images. Yet, as long as we are willing to use many words in one language to translate one word in another, we possibly face a smaller gap in language than in our geographical and cultural experience. "Translation is always a shift," says writer and translator Umberto Eco, "not between two languages but between two cultures."⁸

"gooble" or a "fingfang" we would still communicate just as well as long as everyone in our speech community had learned the same convention. Unlike systematized road signs, though, very few words of our language have gained their link through any group meeting to decide the reference. No matter how the words came into the language, though, the conventional meaning is the usage we start to learn as babies when we babble our first sounds.

This capacity to move into symbolism, using our sounds meaningfully, opens to us as human beings vast possibilities for thinking and communicating: we can think and talk in abstractions removed from our immediate sense experiences; we can speak not just of what is here before us but of what has been, will be, might be, or could be only in the imagination. We are able to connect our own lives with the lives of others in our language community, giving words to categories of experiences that we seem to share and allowing us to create meaning socially. Words group the sensations that we associate in the neuronal networks of our sense perception—or possibly give us a grouping that influences our perception of them. This capacity for symbolism to group and classify our experiences, with its impact on thought and culture, is a topic to which we will return after considering all four ways of knowing, for it profoundly affects what and how we know.

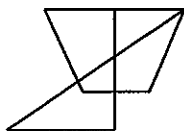
Much of what is involved in human relationships, projects, and endeavours requires verbal and written language. But are there circumstances when words aren't enough, when gestures or other kinds of expression are necessary to get something done? With a classmate or friend, in pairs, try these exercises to consider this question.

Language and "body language": alternative or complementary?

- 1 For this exercise both partners need to be wearing shoes with laces. Imagine that you have been asked to help write a manual on practical matters and have been assigned the task of submitting the instructions for people who have never before tied shoe-laces (they have always used sandals or have gone barefoot).

Independently, both you and your partner should take up to 10 minutes to write the clearest instructions possible. One of you should then read out loud, step by step, your instructions while the other partner tries to carry them out. There is only one rule: **hands off!** Instructions must be verbal; you are NOT allowed to provide any help through gestures or body language. And definitely no touching the laces! Switch roles when the task is achieved (or someone gives up).

- 2 On a sheet of paper draw a series of lines to make a fairly simple geometrical figure (this usually works with 8–12 lines). Your task will be to describe your figure to your partner so he or she can reproduce it exactly. Here's an example of what such a figure might look like:



Take your drawing, some clean sheets of paper and a pencil. Sit back to back on chairs or on the floor so that neither of you can see the other's

drawing. One rule: no turning round, stretching of necks or outright peeking is permitted! Clue: you might want to say things like "fold your paper in half", "divide your paper into quadrants" and the like.

- 3 You and your partner will work as a team on the next exercise, facing another pair as an opposing team. Both teams will write one simple sentence on a piece of paper, and give it to one person on the opposing team to act out for his partner, using no words, no props, but only body movements.

When both teams have done so, try another round. This second time, aim to make the sentence more difficult for the other pair.

Example

Round 1 sentence: "You have just received a letter from a friend saying that she is engaged to be married."

Round 2 sentence: "You have just received a message from a friend asking you whether you would be willing to make a speech at her wedding, which will be a small and modest ceremony next June."

What did you find easy to act out? What was difficult? Why? What can body language communicate more effectively than language can? What can language communicate more effectively than body language can?

In the first exercise, you probably found it was hard to transmit to your partner what you wanted him or her to do without the help of your body. It's likely that you moved your head or hands to indicate (or to represent the idea of) up, down, under or over. Body language, facial expressions and gestures often go together with the words we speak. Very naturally we speak with our hands, move our arms, raise our eyebrows. Together with the words we speak, our bodies help carry the message we want to communicate. You may have suspected that reading a manual with instructions for tying shoes wouldn't be nearly as successful as having an older brother or sister willing to show you patiently how to do it. If so, you were right.

As for the second exercise, ask yourself to what extent having a shared vocabulary helped you and

your partner reproduce each other's drawings and what made it difficult to carry out precisely, nonetheless. If you and your partner hadn't had any vocabulary regarding length and angles, and other conventions to describe the parts of this figure, the task surely would have been even harder to accomplish than it was. Our vocabulary in general, and specialized vocabularies in particular, are central to getting things done and to seeing the world in a specific way.

In the third exercise, you may have many further reflections on the capacity of language to speak of what is not physical, or not physically there, and to make many kinds of connections between ideas.

Language as a symbolic system

Focusing on the words within language can give us a ready grasp of symbolism, with its abstraction from the world of sense perception and its learned, conventionalized references. Yet those words are not isolated. They gain their force in relationship to one another as we manipulate them within the operating rules of our language. We do not possess just independent word-symbols; the entire system is symbolic and gives us nearly infinite possibilities for meaningful combinations.

Each language has its own grammar, learned by every speaker from babyhood. Perhaps later, in school, we may be taught the rules consciously, but prior to any analysis we know how to use words in combination. In order to illustrate how readily we use our grammatical system, try this short exercise.

Work with one other person. If in class, divide up into pairs. Take a sheet of paper and write on it a single sentence of roughly 10 words, spacing the words far apart. Then cut it apart with scissors so that each word is by itself. Shuffle the words into a random order, and let your partner try to make your nonsense order into

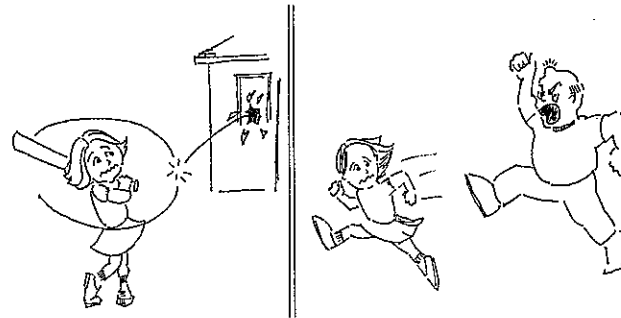
a meaningful sentence. He is free to make a new sentence rather than duplicating yours.

Sample sentences:

- The horse in the stable quickly ate its crunchy oats.
- The paramedics carefully carried the wounded patient into the hospital.

Now try in your group an exercise in placing ideas in relationship to each other. Look at the cartoon, and write one single sentence that puts into words what is illustrated visually in the two frames. Please do not read the follow-up instructions until you have written your sentence.

Now read the following questions and keep them in mind as each of your classmates in turn reads out his or her sentence.



What kinds of connections are being made?

- Is the emphasis on sequence ("and"), on consequence ("because", "causes"), on time relationship ("after", "before"), or on another form of relationship of ideas?
- Listen for what is placed in the main clause of the sentence, and what is placed in a subordinate position. Even if you do not know the terms for sentence analysis, with attention you are likely to hear the differences in pattern.

It is likely that, even given the same pictures of a simple sequence, no two people wrote exactly the same sentence. Although the grammar of the language does dictate that only certain word orders are possible, it also allows such flexibility we may possibly generate utterances that no previous speaker of the language has ever used.

But let us not, while concentrating on language, forget entirely about sense perception as providing the information about which we were writing. Consider the following questions.

- Did you or any of your classmates mention a ball? Can you see a ball?

- Did any of you say that the man had been hit? Does the cartoon show him being hit?
- Did any of you mention the emotional state of the girl or the man, or their intentions? How do you know what they are? In putting what you saw in the cartoon into a sentence, did you include things that you did not see at all, but inferred, making connections between the frames? If so, you have just given yourself a good example of seeing interpretively. In this book, the cartoon is framed with text in English. If the same cartoon were framed with Hebrew or Arabic text, read from right to left, how might you interpret it?

How do we learn language?

Words and grammar, together, give us the symbolic system of language, learned as part of our human heritage. But how do we learn this system?

Many English speakers are concerned about gender bias in English, with the grammatically correct generic form for "he and she" being the male pronoun "he". Many now use the gender neutral "they" in the singular, overriding grammatical correctness in favour of inclusion. Do you think that the dominance of male forms in English (including words such as "chairman" which are now commonly modified to "chair") affects how you think yourself about gender roles?

It doesn't translate #2: gender

Sex, they say, is a biological concept. Gender, they say, is a social one—and a grammatical one. Some languages divide their words according to gender: nouns are either feminine or masculine, regardless of whether they refer to beings with sex or sexless objects or ideas. Does that gender division affect how people think or feel about the objects? Does a noun with a feminine gender bring to mind female characteristics?

Conclusions based on introspection and individual experience may not be as convincing as conclusions based on psychological testing and more general surveys, yet they certainly bring to life the question of whether our language affects how we think about the world. It is a question that has intrigued linguists and psychologists.

Kati Temonen, Finland

In Finnish we have no "he" or "she" even for people. We use "han" which is both and gives us a gender-neutral language. It's not confusing because we add extra words in a context where it's relevant to know whether someone is male or female.



Caroline Laroche, French Canada

A wall couldn't be feminine gender. It just couldn't! If I had to draw cartoons of the things in this room, they would all be male or female.



It doesn't translate #3: structure of politeness

Phiriyaphong Chaengchenwet, Thailand

In Thai the value we place on politeness is reflected in our language. There are several levels of formality that affect the structure of our language, so that we do not use the same forms in interactions between the common people as we would if we spoke to a monk. There is also a special language form for the Monarch.

We also greet very respectfully. The literal translation of "Hello, King" would be "May the power of the



glow of the dust under your majesty's foot bless me." So it's quite obvious that we honour the monarch.

Also, as far as the monarch goes, I think that we have embedded Buddhism in our country quite strongly. The word for "I" used by the monarch would translate as "Buddha's servant". In the special relationship between the monks and the monarch, the monks will call the king "the great supporter", and he calls himself "Self" (after all, it's quite obvious that he's Buddha's servant).

Different possible views have been given within the past century. Behaviourist psychologists considered language acquisition to be a form of behaviour. They considered human beings to enter the world with no inborn capacity for language, but to learn through imitation, through stimulus and response, with correct sounds being reinforced by the positive reaction they received. However, the view of Noam Chomsky is that human beings are born already possessing the capacity for symbolic manipulation, a universal grammar of language that provides a kind of template for learning the particular language of the local speech community.

Although the behaviourist approach illuminated much about the process of imitation and reinforcement in learning generally, Chomsky's version explains more. For one thing, it accounts better for the tendency of young children to regularize the language. A child who says, "I goed there all by myself" rather than "went" has internalized the linguistic rules of the language, and has produced an utterance not by imitating what he has heard but by understanding what, if consistent, it ought to be. Chomsky's model also explains the way children absorb language at an amazing rate, generating meaningful utterances which they have never heard before by combining words using the underlying grammar. His theory seems to be in accord with our current understanding of brain centres for symbolic manipulation.

That symbolic manipulation, by the way, includes the sign language of the deaf, who communicate using a spatial grammar. Before sign language was developed, with the first schools for the deaf being established in France in the 18th century, the deaf had no language connection with those around them. They were often treated as imbeciles and even considered to lack minds. This topic, quite fascinating, might appeal to you for further investigation.⁹

Our theories about how we learn our mother tongues have also influenced how foreign languages have been taught over the past century or so. Two major approaches were based on the idea that we had to be taught explicitly every aspect of a foreign language. First, the grammar-translation method of the earlier 20th century, affected by the long European tradition of teaching the dead languages of ancient Greek and Latin, taught grammatical rules and vocabulary to enable the foreign language to be written. Then, the audio-lingual method, affected by behaviourist views, shifted the emphasis to oral language, training response to verbal cues. Based on the current view that we are naturally "programmed" to absorb language, the newer method of immersion soaks the student in language with the expectation that more will be learned than is explicitly taught. As you look back over your own learning of foreign languages, including your present IB classes in language B, you might see the influence of these differing approaches to language acquisition.

Words: precise or suggestive?

Significant as it is for understanding the way symbolism works, the idea of something standing for something else runs into problems when we try to pin down the reference. Perhaps it is useful to consider the idea that words gain their meaning not solely through

their reference but through the associated ideas that come to our minds when we use them.

Even with words for which the reference seems obvious, we quickly encounter ambiguity, a lack of precision that allows differing interpretations. Try a simple exercise with others to recognize that language, although it allows us to match up our personal experiences with the general ones of our language group, still carries personal variability.

Designate one person to choose a word for some familiar object or animal, preferably one with which most people in the group are likely to have had experience. The rest of you prepare to hear the word and catch what rises in your mind. Then go quickly from person to person and describe what the word stirred you to think of.

Though everyone might agree on the denotation of the word “chicken” (everyone who knows English would point to the picture of a chicken in a book as opposed to that of a tiger or horse), the connotations each person brings to the word differ. I may think of my pet Cornish hen, whereas you might think of yesterday’s fried chicken dinner. So it is unlikely, even with a word that stands for a concrete thing, that we will all carry the same associations. How unlikely it is, then, that we will all carry the same associations with words that refer to abstract ideas such as “justice” and “international-mindedness”.

Attempting to converge in our associations with words leads us to attempt precise definitions, as well as to use concrete examples for illustration. “Skinny” and “slender” both converge in the denotation of “thin”, but diverge considerably in their connotative overtones of meaning, created in this case by the different values placed on being thin. These connotations of words can be extremely difficult to pin down, as most new speakers of a language are aware. How exactly is that word used, and why is the one in the dictionary just not right in that context? What is the “flavour” of the word or its “halo” of meaning?

Choosing the right word can be a struggle in all areas of knowledge, but the nature of that struggle—whether it is to try to pin down definitions more and more precisely in order to use language entirely denotatively, or whether it is to choose words deliberately for exactly the right aura of connotations—depends on the area. In one area we might complain that language is imprecise; in another we may praise its suggestive resonance. For an appreciation of the way that different goals affect our language use, respond to the following questions on sunlight, gold, and gardens.

The Sunlight on the Garden

The sunlight on the garden
Hardens and grows cold,
We cannot cage the minute
Within its nets of gold,
When all is told
We cannot beg for pardon.

Our freedom as free lances
Advances towards its end;
The Earth compels, upon it
Sonnets and birds descend;
And soon, my friend,
We shall have no time for
dances.

The sky was good for flying
Defying the church bells
And every evil iron
Siren and what it tells:
The Earth compels,
We are dying, Egypt, dying

And not expecting pardon,
Hardened in heart anew,
But glad to have sat under
Thunder and rain with you,
And grateful too
For sunlight on the garden.

Louis MacNeice

Photons on the ecosystem

Language in science

- Physics students, what is light? How would you describe it, using language appropriate to physics? How does it travel? What is its speed?
- Chemistry students, what is gold? How would you describe its properties, using language appropriate to chemistry? What is its symbol and position on the periodic table?
- Biology and environmental systems students, what is a garden? How would you describe an ecosystem, using language appropriate to biology? What is the reaction of plants to light? Can you give a formula?

What is the attitude in the sciences toward ambiguity of language? What kind of language do you expect in this area of knowledge and why? Why are numbers and other symbols used?

Denotations and connotations

Now take each of the words above not solely for their denotations but for their connotations, their shades or overtones of meaning.

- What are your associations with "sunlight"? Does "sunlight" mean something other than "light"? Do you have a personal response to the word?
- What are your associations with "gold"? What stories or legends do you know in which gold is important? What sports events or social practices?
- What are your associations with a "garden"? Do you have personal memories, or cultural (perhaps religious) associations?

Now read the poem by Louis MacNeice, and consider ways in which his use of language differs from what you would expect in your science course.

Language in poetry

- Does sunlight factually "harden and grow cold"? Would you try literally to cage a minute? What is a metaphor? Is MacNeice, in the poem as a whole, actually talking about a garden and sunlight, or is he saying something else?
- Does "beg for pardon" mean (a) to apologize, or (b) to petition to cancel a punishment such as execution? How can you tell? Is every interpretation in poetry equally valid?
- "We are dying, Egypt, dying" is a modification of "I am dying, Egypt, dying" in Shakespeare's *Anthony and Cleopatra*, IV, xv, 41. These are among Anthony's last words, addressed to his beloved Cleopatra of Egypt, as he dies. In their private love affair, the lovers have not been able to escape the forces of empire and their public roles. Why does MacNeice use Shakespeare's line here? Would

borrowing someone else's work without acknowledgement be acceptable in science?

- Would you expect scientific language to use rhythm, rhyme, alliteration, assonance, and words seemingly selected for their sound? What is their effect in this poem?
- Why does MacNeice repeat himself in the final stanza? Was he not able to make his point the first time?
- Does the meaning of the poem change with the addition of the information that it was written in 1937, when MacNeice could see war in Europe on the horizon? Does it affect your interpretation of the poem as a whole to know that the "iron sirens" are air raid warnings?
- A poem, like a song, can gather personal associations which add to its meaning for you individually. Does it surprise you that many people have such associations with this poem? Does it surprise you that past IB students have written songs with this poem as the lyrics?¹⁰ Would it surprise you if they had written songs using text from their chemistry textbooks?

A note on "symbols"

As you move from TOK class to your language A1, you may encounter confusion over usage of the word "symbol", as the word is placed in context of a different kind of discussion. Although in TOK we speak of all words as symbolic, the literary use of "symbol" involves a further level of suggestion. As we see in this poem, words or clusters of words can be used as images with suggestive power: the sunlight on the garden is a metaphor for the happy moments shared with a friend in a paradise threatened by the new circumstances of changing times. A symbol in literature has ambiguity and suggestive resonance beyond that of a metaphor. It can no longer be treated as a reference to something else specific, or as an "equation" with the parts, although equivalent, still separate. Instead, a symbol in literature is a fused unit resonant with meaning that cannot be rationally explained. Symbols may be drawn from culture (the cock crowing) or from psychological archetypes (the "man within"), or may be created within the work by the way in which the author treats an object, image, or action to make it gather associations.

It doesn't translate #4: sacred text

Isaac Sadaqah, Jordan

We can't translate the Koran to any other language. The Arabic is perfect, given by God—Allah—to Mohamed, and if we translated it, it would lose its perfection.



Mohamed Shakir, Maldives

If we translated the Koran, it wouldn't be a miracle anymore. I don't speak Arabic, but I read the Koran in Arabic. I do have a translation to understand the meaning, but I learn the Arabic to hear the beautiful rhythm and hear the words given by Allah to the Prophet.



It doesn't translate #5: your own examples

Can you add examples of your own? What, for instance, are "tones" in Chinese, Vietnamese, or Thai? How are family relationships named in different languages, and do the differences suggest anything about cultural attitudes toward family?

Hypothesis of linguistic relativity

It has been suggested that the particular language we speak causes us to think in a certain way (Sapir-Whorf's hypothesis of linguistic relativity, 1920s to 1930s), and that speakers of different languages consequently perceive the world quite differently. This hypothesis has not been supported: (a) it was based on too little research for the reach of its conclusions and may not even be testable because of the difficulty of separating language from culture to examine reciprocal causal influences; (b) it does not seem compatible with the differences in thinking of speakers of the same language, or

similarity of those of different languages; and (c) it exaggerates the difficulty of translating from language to language, given that we are not restricted to finding single word equivalents. Yet the hypothesis has received considerable attention, perhaps because it seemed to illuminate differences between ourselves and others, or perhaps because the idea of being tricked by language into seeing the world in a particular way was intriguing. We now consider differences between languages to be the surface of a deeper symbolic capacity. The variation, however, is far from trivial for those seeking a window into the cultural worldviews of others.

Roles of language

Chemistry textbooks and poetry are only two of the forms in which we meet language in our daily lives. All day long, we use language for a huge variety of purposes, often fused together.

- We think, using the symbols of language as tools for thought.
- We interact socially, connecting with others through greeting and conversation.
- We give factual reports.
- We express our emotions.
- We create, using language for literature or for humour.
- We persuade others.
- We give instructions, make requests, or otherwise affect actions around us.
- We change our lives, for example by pronouncing marriage vows.

What other uses of language would you add to this list? For which ones are clarity and precision important, and for which is ambiguity either less of a problem or even an advantage?

In a chemistry textbook or a poem, we can recognize the role that language is playing and can identify the way that authors will treat connotative overtones of meaning. In many other contexts, though, it is far less evident what the writer is attempting to do, and it is by giving our attention to features of language that we can judge whether we are being given a factual report—or whether we are being given something closer to an expression of emotions or even an attempt to persuade us to think and act in a particular way.

Names and connotations

Shakespeare wrote, "What's in a name? That which we call a rose by any other name would smell as sweet." (Romeo & Juliet, Act II, Sc. II) Not everyone agrees.

- Would it have made a difference to the story had Romeo fallen in love with "Harriet" or "Susan", not "Juliet"?

- Does your name (first name, last name) mean anything? If it doesn't, is it easy to imagine exchanging it for any other name?
- In your society, are there more common and less common last names? Do certain names have certain socio-economic, political, religious, ethnic, or other connotations?

When you hear names like "Smith", "Goldstein" or "Gómez" do particular associations come to mind? Where do these come from? Are these assumptions or connotations true in the same way that saying triangles have three sides is true?

What would your view be of someone who you have casually spoken to whose business card you happened to find on the locker room floor and

whose name is accompanied by: MD, D.Phil, CEO, Mrs, Sir, III, Junior or Lady?

How might your preconceptions about names influence your perception of the people you meet? How might others' preconceptions of your name (or nationality, religion, skin colour, etc.) affect how they perceive you?

Language, emotion, and values

In trying to make this judgment on whether we are being given a factual report, we meet four points for attention similar to those we first encountered in Chapter 1, applied to maps.

- *Selection*: Out of all possible events or details that could have been reported, what has been chosen? Is it possible to compare the description with another by someone else? We can be grateful that a writer selects only the important things to tell us—whatever "important" might mean to him—rather than drowning us in detail. We can also expect that the purpose of the report and its intended audience affect what he picks out. Yet any selection is made according to criteria, and we need to be alert to what the criteria seem to be.
- *Emphasis*: Out of all the events or details reported, what has been stressed as most important, and, again, what do the guiding values or criteria seem to be for this emphasis? How has the emphasis been achieved: through placement of ideas in the main clause rather than the subordinate clause of the sentence? through placement in emphasized positions, such as the final words of a sentence or paragraph? through more detailed treatment of some details rather than others?
- *Word choice*: What kind of language has been used, and does it seem to be appropriate to the apparent purpose of the description? Is it denotative, factual language, or is it connotative and suggestive? What emotions are expressed? What values, positive or negative, are expressed or suggested? Is there evidence of bias? Is a person described as "courageous" or "reckless", as "relaxed" or "lazy", as "curious" or "nosy", as "assertive" or "pushy"? The choice of words in the description may tell you more about the writer's values than about the person being described.
- *Context*: In what context has the description been placed, and how might this framing affect the overall meaning of the passage? What does its purpose seem to be?

Creative writing activity

Choose one incident from your own life, possibly an event familiar also to others so that you can share your writing afterwards with a sense of recognition (and perhaps amusement). Write a list of five to ten pieces of information about your subject. Then write two descriptions of it which do not contradict each other factually but which communicate quite different

values and emotions through your selection of information, the emphasis you place on some information, and your word choice. Examples follow.

Home in the Negev Desert 1

In the centre of the vast Negev desert lies a small spot of green. That miraculously green dot in the endless yellow is my home. It lies on the edge of a gorgeous valley where the view is breathtaking and the peace and quiet feel like divine magic. The air is so clear and pure, so different from the city. On most days the weather is very good: the sun is shining and the sky is blue. Everyone knows each other in my village, and smiles when they say hello. It is a wonderful place to grow up in—no commotion, traffic, drugs, or violence.

By Gal Pinshow

Home in the Negev Desert 2

In the centre of the dry and harsh Negev desert lies an almost unnoticeable spot of green. That small spot in the endless nothingness is where I reside. It is situated on the edge of an arid valley where everything is so quiet that one can almost hear the sound of death. The air is so clear that it has no special fragrance, maybe because there is nothing out there to smell of anything, apart from sand and half dead bushes. Most of the time the sun is shining full blast so that it gets so hot breathing becomes hard. Everyone in the village knows everything about each other because there is nothing better to do than gossip. Nothing ever happens in the village. Even thieves don't bother making the trip out into the middle of nowhere.

Arrival at an International College 1

It was the beginning of a wonderful adventure. As soon as I arrived on campus I could sense the anticipation in the warm air. I walked around the campus in search of my new home, which I had been told was called "East House" and wondered at the flowers and the landscaped scenery which the small path meandered through. As I walked past the cozy wooden buildings which nestled close to the sloping lawns I came upon a group of students lounging in the sunshine. Struck by the diversity of the group I stood for a moment in amazement; it was real, all the smiling pictures of a perfectly balanced "ethnic mosaic" which had graced the pages of my guidebook were in fact small glimpses of the cultural cross-section which I was to encounter here. As I stood there, one of the girls in the group noticed me and smiled in greeting. "Welcome! Do you need a hand with your luggage or anything?" she asked, and before I even answered she bounded to her feet and cheerily offered to carry some of my bags while accompanying me to East House. I followed her gratefully and only hoped that the other people I met would be as friendly.

by Snow Dowd

Arrival at an International College 2

It was the end of my wonderful summer and the start of untold troubles, struggles and academics. As I crawled out of the sweltering car I could feel the tension in the air. I struggled up the crooked, concrete path dragging my belongings and hoping desperately to find the obscure residence which I knew only as "East House". As I wandered hopelessly through the maze of brooding low-slung buildings and bedraggled rhododendron bushes I finally came upon what I hoped was a change of direction. A motley group of students lay sprawled on the yellowed grass in the merciless heat. As I stood there stunned by the strangeness of the faces, one of the girls in the group spotted me and instantly donned a plastic smile; it could have been photocopied from one of the many "happy ethnic" pictures which splattered the pages of my handbook. "Welcome!" she yelled as if a string had been pulled. "Do you need a hand with your luggage or anything?" she demanded, and before I could respond she charged to her feet and grabbed my bags while gleefully informing me that she would take me to my residence. I trudged after her and only hoped that the other people I met would be more amiable.

Take back the language: words tell a story of their own

by Keith M. Woods

March 20, 2003. The Iraq campaign has commenced. Embeds are sending in their dispatches. Now, journalists must be vigilant in protecting against collateral damage. Because in times of war, clarity is often the first casualty. And independence is usually not far behind.

The language of the military, like that of the local police department or civil court, can be muddled in obtuse, euphemistic jargon that has the seductive quality of making journalists sound like they're in the know.

Language has always had a power that tilts toward those who define the terms. Journalists interested in maintaining their independence—real and perceived—have to pay attention to the difference, say, between a war and a “campaign”; between “collateral damage” and the killing of innocent people.

The military isn't making it easy, layering atop its lingo a hefty supply of patriotism, nobility and machismo. The bombing and invasion of Iraq is called “Operation Iraqi Freedom”. The concurrent assault on Afghanistan is called “Operation Valiant Strike”. US soldiers in Kuwait fire “Patriot” missiles to bring down incoming Iraqi missiles.

When warships and bombers fired the first shots of this war, trying to kill Iraqi leader Saddam Hussein and other leaders, military analysts dubbed the goal a “decapitation”, a gruesome euphemism that sidesteps another loaded term for killing a national leader: assassination. The 2,000-pound bomb used in that attack carries the flippant nom de guerre “bunker buster”.

The argument here isn't that there should be a prohibition on using government—and military—speak. The trouble comes when journalists adopt the language, take it out of quotation marks, remove the modifiers that tell news and listeners that this is someone else's language. Then the patriotism, the nobility, the

testosterone-infused terminology slip insidiously into the cracks of our independence and erode one of the profession's cornerstones.

So “shock and awe” becomes more than just the coined slogan of one military man. “Smart” bombs drop with their intelligence unchallenged by the media. In our prose, distant warriors launch surgical strikes without quotation marks, allowing one more military-slanted phrase to slip past numbed sensibilities. Chalk up another victim of friendly fire.

In times of war, clarity is often the first casualty. It's not so hard to avoid such a fate. First, recognize that what's at stake is more than a word here or there. Journalists are not beholden to the military or its choice of words. Nor should they appear to be. Next, take a clear-eyed look at why some of the language makes its way into your sentences. It's cool. It's edgy. It endears journalists to their military sources and an audience that, especially during these tense days, wants to know that we're all on the same side. You can't defend that journalistically. Not even with a Patriot missile.

Recapture the language with specifics and precision. “Smart” bombs are, more accurately, laser-guided or computer-guided bombs. Leave the IQ assessment to someone else. Reserve language declaring missions “surgical” for events witnessed by reporters or reliable sources. Otherwise, just describe what happened. Avoid repeated use of aggrandized mission names: Desert Shield, Desert Storm, Iraqi Freedom, Valiant Strike. They are not neutral terms.

As the war escalates, as people die and buildings fall and the unpredictable future unfolds, remember that the words you use to tell the story will tell a story of their own. Make it a story of journalistic independence. Clear. Accurate. Precise.

Anything but surgical.¹¹

Metaphors of time and space: the case of the Aymara culture¹²

The metaphors that come naturally to speakers can be very different, a fact that probably contributes to the view, held by some, that people who speak different languages in some sense (a metaphorical sense) live in different worlds.

If someone asks you to point to the past, you will probably do something like lift your arm and point your thumb over your shoulder, indicating what is behind you. In most Indo-European languages, including English and Spanish, it is assumed that the past is behind while the future lies ahead, as a

road or path as yet untravelled. These are our languages' spatial metaphors for time.

Roughly one million Aymara speakers live in Peru, Bolivia and northern Chile. According to anthropologists, in the Aymara culture and language a very different set of spatial metaphors operates. The Aymara situate themselves in time as if seated in a rowboat, travelling into the future (at their back) while facing the past from where they have come.

In Aymara *q'ipa nia marana* means next year; when literally translated the expression means

"in the year behind" or "at our back".

In Aymara *ancha mayna pachan* means a long time ago; literally translated it means "a long time in front of you."

What are other metaphors you use to refer to time? To get started, think of some typical aphorisms like "time flies when you're having fun". What might these metaphors reveal about a culture's attitude to time? Compare your findings with how your language B treats time.

Metaphors as pervasive figures of thought

by Julian Kitching

Metaphor involves the application or use of a word or phrase as a form of comparison. If you said that someone is a snake, you would not mean it literally. When you make this comparison you imply that there is something about that person that reminds you of a snake. In other words, metaphor is mapping one concept onto another or comparing one with another. The source, what the concept or entity is compared to, the snake in this example, is often either more concrete or better understood than the target, the idea under consideration, the person you are talking about. The relationship between the two is focused through a selective treatment of their similarities and differences. The comparison often stretches systematically beyond the particular metaphor itself into other metaphors and assertions that extend the comparison.

Thinking a little more deeply, it is possible to identify certain systematic and pervasive metaphors that underlie our thinking: we often talk about organisms—our own bodies and those of other creatures, for example—as

machines. Bodies "function" and "break down", the food we eat is "fuel" and we "burn energy" when we exercise.

Metaphors play different roles when we use them.

- They can have an explanatory role, for example your biology text might portray the nervous, immune, and endocrine systems as components in a telephone or communications network. As a result this metaphor helps you think immediately of connections and relations, not isolated parts.
- They can serve to challenge orthodox thinking, as Darwin's "natural selection" did in his day, and Richard Dawkins's "selfish gene" has done more recently.
- They can condition our thoughts and actions, such as in the case of the "war on terror", where a geopolitical situation has been portrayed in one particular manner. Perhaps even more pervasive is the way we associate environmental factors (e.g. light and dark) and basic orientations (up and

down) with connotative words of values. Consider the values suggested by the Dark Ages as opposed to the Enlightenment, or "feeling high" as opposed to "feeling low".

A case has been made for metaphor being a basic mode of thought. If this is anywhere near the truth, it has far-reaching implications for our approaches to knowledge. It would support the contention that we function within systematic conceptual frameworks constructed largely through comparison, which guide our sense perception and thinking.

Knowledge itself has also been subject to extended metaphorical treatment, being regarded, for example, as a building or a ship at sea. Below are elaborations for these two metaphors.

Knowledge is a building

It is constructed and solid. It is built from the bottom up, and the foundations must be secure in order to support the rest. It can be added to, or renovated, and it could also be knocked down. It can be functional or it can be aesthetically pleasing. All the parts fit together.

It could be claimed that the building metaphor has affected attitudes to knowledge. You might

be attracted to the idea of a unitary system of knowledge that considers simplicity as a virtue and has the most reliable knowledge at the base. But opinions differ as to what this most reliable knowledge might be. Do you think it might be mathematics? Logic? Knowledge of self, or of history?

Knowledge is a ship at sea

The ship must be maintained and repaired without returning to port. This means that it cannot be entirely disassembled; at least certain parts of it must be kept intact in order to prevent the entire vessel from sinking.

What would this metaphor imply about how knowledge evolves? Can you think of any examples that fit this metaphor?

Now, in small groups, take on one of the following metaphors, prepare a short presentation showing how you might develop it, and then defend it as the best of all the metaphors for knowledge: Knowledge is a web, Knowledge is a map, Knowledge is a collection of stories, Knowledge is a mirror, Knowledge is a crossword, Knowledge is a chain, Knowledge is a window into an aquarium.

On pervasive ideas and metaphors

Sometimes an idea becomes so commonplace, so much a part of the cultural consensus, that it sinks out of awareness, becoming an invisible thread in the fabric of thought. Then we ask and answer questions, collecting information without reflecting upon the underlying idea that makes this possible. The idea becomes as subliminal as the grammar that governs our language each time we speak.

Most of our master ideas about nature and human nature, logic and value eventually become so nearly subliminal that we rarely reflect upon them as human inventions, artefacts of the mind. We take them for granted as part of the cultural heritage. We live off the top of these ideas, harvesting facts from their surface.

Theodore Roszak (1986)¹³

Language and other forms of symbolic representation

Language is our dominant form of symbolism, but it is certainly not our only one. Compare language with other forms of symbolism such as maps, photographs, scientific models, paintings, mathematics, and music and consider the roles all of these play in our gaining and communicating knowledge. Feel free to bring in other forms beyond these six into class discussion, and to compare them on bases that go beyond the ones raised in the questions below.

- 1 Do any of the other forms of symbolism operate as a system, as the combination of words and grammar does in language to create meaning? What similarities and differences do you find?
- 2 Look back to the list of roles of language on page 42, to which you will have added your own ideas. Does any of the other symbolic forms function for as many purposes in our lives as language does? What, would you say, is the role that each of the others plays most effectively? Is any of the others, do you think, actually more effective than language to communicate certain things?

- 3 Place these forms of symbolism on a scale from:
 - at one end, maximum precision of meaning and convergence of public understanding to
 - at the other end, maximum ambiguity and divergence into individual understanding.

Compare within your class both your scales and your reasons for placing particular forms of symbolism in their positions.

- 4 With what other ways of knowing (sense perception, emotion, and reasoning) do you most closely associate each of these forms of symbolism?
- 5 With what areas of knowledge do you most closely associate each of these forms of symbolism?

Notice how you have been discussing symbolism and language: through language. Could any of the other forms of symbolism have been used in this way?

Notice how familiar it is for us to compare and contrast, group and make distinctions. We will return to a discussion of classification after considering two more ways of knowing: emotion and reasoning.



maps

$$(73 \times 10) + 83 = 813$$

mathematics



music



photographs



scientific models



paintings

Language: a tool for thinking and communicating

Expanding your vocabulary gives you better tools for drawing distinctions and understanding shades of meaning. As a result, you increase your potential for exploring ideas and communicating effectively with others. Use your own familiarity with usage or a dictionary to ensure that you understand the following words, useful in TOK and elsewhere.

Does a dictionary describe how words are used or prescribe how they ought to be used? Some languages (French and Spanish, for example) have language academies which decide regularly which new words to accept into the language and thus to add to their dictionary. Other languages have no such control over their change.

What arguments would you make for preserving a language? What arguments would you make for accepting change?

The words below are ones useful for you to know. Even if you do not add them to your active spoken vocabulary, they will increase your reading comprehension.

evaluate	concrete	cogent	dubious
assess	empirical	relevant/irrelevant	spurious
judge/judgment	objective	deplore	duplicious
assume/ assumption	subjective	incite	fraudulent
presume/ presumption	rudimentary	denounce	bogus
premise	fundamental	vilify	alluring
axiom	subtle	coerce	dazzling
principle	flagrant	dogma/ dogmatize	unscrupulous
conception	blatant	declaim	insidious
preconception	implicit	pontificate	devious
stereotype	explicit	indoctrinate	deft
archetype	subliminal	allege	illusion
antithesis	arcane	insinuate	delusion
contradiction	esoteric	equivocate/ equivocal	ruse
cohere/ coherence	erudite	engender	ploy
correspond/ correspondence	covert	bypass	insight/insightful
pragmatic	credence/credible/ credulous	clutter	perceptive
expedient	susceptible	subvert	acute
infer/inference	naive	feign	obtuse
imply/implication	gullible	denotation	engage/ engagement
demonstrate/ demonstration	skeptical	connotation	inquiry
contend/contention	sagacious	resonance	balance
abstract	judicious	bias/biased	reflection
	compel/ compelling	distorted	self-awareness
	discerning		

As you learn in all of your IB Diploma Programme subjects, you will be challenged to increase the range of your thinking and your vocabulary.

Emotion

Our direct experience of the world has at its core our emotions. The words "emotion" and "motivation" both derive from the Latin *movere*, meaning "to move". "Emotions shape the landscape of our mental and social lives," says Martha Nussbaum, author of *Upheavals of Thought: the intelligence of emotions*.¹⁴ Our emotions accompany us

throughout our lives so thoroughly and profoundly that it may be difficult for us, in experiences and memories, to consider sense perceptions and ideas without their inter-threaded emotions.

We know that emotions can be activated by external causes (being chased by a famished lion causes fear) and internal causes (one may wake up feeling sad one morning but not know why). We also know that different cultures and languages catalogue the emotions in different ways. But there is still no exact, universally agreed upon definition and categorization of emotion, nor agreement about the boundaries between emotions on the one hand, and feelings and moods on the other. Moreover, the relationship between the emotions and our cognitive (intellectual) apparatus—that is, what we know, think, believe, desire, and value—is also the subject of academic discussion and debate amongst philosophers, psychologists, and neuroscientists. However, we can assert very broadly that emotions are reactions or responses related to sense perceptions, internal states, thoughts, or beliefs about things or people, real or imagined. For the purposes of this book, we will use the terms “emotions” and “feelings” interchangeably.

Knowing our emotions

It is likely that our emotions have prompted us to reflection more frequently than other ways of knowing. We may be more likely to ask ourselves, “Why am I feeling this way?” than “Why am I hearing this way?” or “Why am I speaking this way?” The perceptual sweetness of honey has provoked fewer songs than the emotional “sweetness” of love.

Yet how do we know our emotions? Before we go on, push your own reflection further by asking four questions, and giving as many answers as you can. Share your ideas with others in order to build up together the greatest range of possible responses.

- 1 How are you feeling right now, at this moment? How do you know?
- 2 Why do you think you’re feeling this way?
- 3 Ask for a volunteer willing to share what he is feeling. Before he does that, try to guess what that person is feeling right now, at this moment. How do you know?
- 4 To what extent do you think knowing your own feelings depends on knowing the feelings of others, and knowing the feelings of others depends on knowing your own?

It is likely that by focusing on these few questions, you will have identified key topics that are being actively researched by psychologists and neuroscientists right now.

To an extent, though, one answer appears, at least at first, to be very straightforward. You know your emotions because you feel them. Your own personal introspection provides you with privileged access to your own feelings. Just as only you know your own sense experience of the world “from inside”, only you know your own emotions directly, as something felt inside yourself. If you say, “Right

now I know I am happy," (or bored, depressed, or in love) you mean that your direct experience and personal familiarity with yourself leads you to this conclusion.

But can you be wrong when you identify your own feelings? Might parents, friends, or teachers help you recognize what you are really feeling when you initially thought you were feeling something else? Those who know you well may give you, at times, some indication that you seem to be feeling something that you had not yet noticed yourself. You might realize through others, for example, that you are under stress, excited, jealous, or falling in love. Although attitudes toward counselling vary considerably with culture, many people have benefited from counselling which has helped them to recognize their feelings better and identify possible causes for them.

Emotional intelligence

In recent years emotions—others' and our own—have been a subject for research on the brain and learning. Understanding of our own emotions (intrapersonal intelligence) and the emotions of others (interpersonal intelligence) has been treated as "emotional intelligence". Howard Gardner put forward in his book *Frames of Mind* in 1983 a theory of seven intelligences: linguistic intelligence, logical-mathematical intelligence, spatial intelligence, musical intelligence, bodily-kinesthetic intelligence, interpersonal intelligence, and intrapersonal intelligence. These last two kinds of intelligences are related. Interpersonal intelligence means understanding other people and their motivations and implies being able to work well in cooperation and collaboration. All sorts of successful people from teachers to religious leaders and politicians probably display these skills to a high degree. Intrapersonal intelligence involves just the same abilities turned inwards onto oneself.¹⁶ Identified as separate forms of intelligence, interpersonal and intrapersonal intelligence nevertheless involve us in similar ways of trying to answer the question, "How do I know?"

Perhaps it is not surprising that some of the ways of identifying our emotions include language, sense perception, and reasoning. All three provide highly interconnected ways of associating the emotions we experience with those that other people experience, and allow us to emerge from solitary introspective awareness into some degree of shared knowledge.

Knowing emotion through perception

Our senses allow us to gather sensations from outside and inside our bodies, and to observe both our own physical responses and the behaviour of others. Admittedly, observation does not allow us to see the emotions of others directly: we can perceive a rose's "redness" but cannot directly perceive someone else's "sadness". However, our senses give us clues about what the emotional state of others might be, and, if the inquiry is structured into systematic studies, our senses can tell us even more.

How is another person feeling? Can you read his "body language"? When people communicate, observers gain information from seeing

"One of the pitfalls of childhood is that one doesn't have to understand something to feel it. By the time the mind is able to comprehend what has happened, the wounds of the heart are already too deep."

Carlos Ruiz Zafón¹⁵



Edgar Degas, *Absinthe*,
c.1875-76

What do you "read" the woman's body language to be? How does the structural composition of the painting heighten the emotional impact? How does the title of the painting affect the interpretation?

their actions: how they move their hands, sigh, play with their hair, shuffle their feet. Listeners catch the tone of the voice and the pauses of silence. We can often catch very subtle cues, from the slight constriction of the lips or forehead, or the involuntary dilation of the pupils of the eyes. Highly acute observers, often not even conscious of their swift reading of tiny signals, are often considered intuitive in their capacity to "sense" how someone else is feeling.

In observing a particular pattern of actions or gestures, we come to associate it with a particular emotion (through the naming of language and generalizing of reasoning). Observation of others' actions can then give us a context for recognizing our own (and vice versa). You can realize that you are angry as you notice that you are sounding and acting like an angry person.

Activity: Ask for a volunteer or two to go out of the room and then re-enter, simulating the body language of a particular emotion. The rest of the group tries to guess what emotion has been acted. Is there general agreement?

Attempts to know an emotion based on such observation, though, do encounter some evident problems. Misinterpretation is a constant danger, especially when we do not know the person very well, or when the person is from an unfamiliar culture with possibly different codes for what emotions are acceptable to express and what physical gestures are appropriate. Moreover, people can often choose whether to hide or display their emotions.

More rigorous observation has taken the form of studies, such as those on facial expression of emotion. Researcher Paul Ekman, internationally testing recognition of emotional facial

THE MAN, HIS WIFE, AND THE OTHER WOMAN:
A VERY, VERY, VERY SHORT NOVEL

Chapter 1

"I'll be back soon, dear." With a quick squeeze of his hand, his wife was gone, and he was left an opportunity to sit down and rest his weary feet.

The fresh aroma of the famous house coffee filled his nostrils, and he decided upon a cappuccino with just a light dusting of cinnamon, and, of course, the chocolate torte. From the shade of the umbrella over his small table he soaked in the warmth of the summer and noticed the gentle breeze which stirred his hair and rustled his newspaper. He was aware of the glorious colour of blossoms among the greenery of the park across the street and the laughter of children at play.

He glanced at the clock. Still plenty of time to relax! He turned to the sports page.

What emotion do you think the character is experiencing? How can emotion affect our perception of our surroundings? How can our surroundings affect our emotions?

THE MAN, HIS WIFE, AND THE OTHER WOMAN

Chapter 2

"It's been a long time," she said.

"Yes. A long time."

"I saw her leave. Your wife."

"Yes, my wife. My wife."

Her dark eyes held his and neither spoke. A waiter approaching with a menu hesitated, and then retreated to leave them alone.

"I didn't think," he faltered, "that I would ever see you again."

This text doesn't give the feelings of the characters, just their dialogue. If you were the director of this film, what emotions would you tell the actors to play and how would you suggest them to the audience? Is there more than one interpretation of this scene?

expressions, concluded that four specific emotions were recognized everywhere: fear, anger, sadness, and enjoyment.¹⁷

Observation has also taken the form of biological study of the human body to tell us more closely what is going on "inside". Physiological changes in the body (heart rate, sweaty palms, and so forth) can be monitored as evidence of certain emotional states. In language we distinguish between the "physical" and the "emotional", but mounting medical findings indicate that this distinction cannot be made neatly. Emotions are affected by (or created by) our physical state, such as our biochemical balance; and our physical state, even our health, is affected by our emotions. Indeed, it has been argued that the biological condition is not just the cause of the emotion but is the emotion itself as we sense it.

Knowing emotion through language

Our ability to give names to emotions and speak of them with others indicates an emotional life shared with others and understood in terms of the classifications given by our own particular language. Language and perception together contribute to our understanding: we learn the word as it is applied to observable behaviour and use it to describe the invisible emotion.

However, applying words from external clues, we can't be sure that what we experience ourselves is exactly what someone else has experienced and means by the word. It is quite common to wonder if what one is feeling is really "love", or if you and your partner mean the same thing when you say "I love you".

Naming also faces the further difficulty of the shifting and blending of emotions. Naming sense perceptions is difficult enough as red gives way to orange on the way to yellow, or as a rock becomes an island on the way to a continent. Emotions are even more difficult to classify, not just because we cannot see them, but also because they may mix together in a way that our perceptions do not. An emotion can, metaphorically, be experienced as red and yellow simultaneously without being orange, in a way which reasoning would condemn as contradictory: it is possible to be sad and happy at the same time (at a wedding), or feel love and hatred mixed together (in jealousy), or feel joy at being reunited with your family at the same time as you feel sadness over leaving behind your friends. Words for emotion are thus extremely ambiguous.

The naming and classifying of these emotional responses and their combinations has not been without debate. Having done his studies of facial expressions, Ekman concluded that the four that his subjects had identified were the "core" emotions, rather like primary colours that could be the basis for shades and blends. Other psychologists have argued for different sets of basic emotions, from the simple opposition of happiness and sadness (Weiner and Graham) to Tomkins' set of nine: anger, interest, contempt, disgust, distress, fear, joy, shame, surprise.¹⁸

It would seem that, whether happiness is a basic emotion or not, the concept we have of it is not necessarily a human universal that applies across all cultures at all times, but is rather a concept that has

Nakhshab Farhikhtah

Once I was speaking Persian on the phone with my sister and I was trying to explain to her how frustrated I was about something. In Persian we don't have a specific word for frustration so by the time I had tried to explain my emotion the meaning of what I was saying had slightly changed from what I really meant. My knowledge (of language in this case) became a tool for distinguishing the difference in my emotions, but its limitation was that I could only express it properly in the very same language that I had learnt it in.



Kohei Noda

In Japan, we like to keep communication a little fuzzy. We prefer being able to understand from a hint and not being so precise. We have so many ways of suggesting and saying things indirectly that a foreigner couldn't catch.



Emotions are not shown as openly as in North America, though in our generation we do show more than our parents did. In terms of love, we're really shy. Parents don't say, "I love you" to their children and children don't say it to their parents. But we can still see it. The scale is just different.

We also have to be sensitive to relationships and circumstances as we speak politely, so

that we choose a more respectful level of language when speaking to elders. In most schools in secondary education, we have to use the words giving respect to the older students, even if they are just a grade ahead.

But it's not as simple as having different levels of formality or politeness, because so many different factors are involved. There are more than ten ways of saying "you" depending on your respect for the person, a combination of your age and their age, and their sex. Some choices sound a bit feminine but they are still okay for men, depending on the situation and the relationship. We can sound more loving, more hostile, more formal, more casual. The right choice of words communicates feelings for them.

changed over time. According to Darrin McMahon, a historian at Florida State University, "In virtually every Indo-European language, the modern word for happiness is cognate with luck, fortune or fate." *Happ* was the Middle English word for "chance, fortune, what happens in the world" according to him, "giving us such words as 'happenstance, 'haphazard', 'hapless' and 'perhaps'".¹⁹

It is probably unsurprising, given the variability of ways of classifying and thinking about emotions, that different languages reflect, and possibly reinforce, particular feelings. The words that different cultures use to describe the emotional worlds of their members give us a clue about the way different structures may mould the emotional experiences of their people, according to David Matsumoto.²⁰ He reports, for example, that the German word *schadenfreude* has no equivalent in English, though roughly translated it means pleasure derived from someone else's misfortune. The Japanese words *itoshii*, *ijirashii*, and *amae* also have no exact English translations, though they describe longing for an absent loved one, a feeling associated with seeing someone praiseworthy overcoming an obstacle, and dependence, respectively. Similarly, the metaphors for emotion in different languages vary with the cultural background of the speakers, for example with black being associated with mourning in Europe and white with mourning in India.

Knowing emotion through reasoning

Reasoning, as we will soon be discussing, enables us to establish a relationship between particular experiences and more broadly general ones within the world we perceive. We watch the tide rise and fall not once but again and again, and then we draw a general conclusion. We thus arrive at a general understanding that allows us to fit today's tides into a pattern and to predict them. Even actions in the world that are less regular can be placed in the context of broad

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Chapter 3

"I'll be in the bookstore by the church at 10:00 tomorrow morning. If you joined me, we could go somewhere...and talk," she offered, her eyes shining. "Maybe we could even...even go back to my place. For...some lunch."

"Oh yes!" he gasped. "But what if he found out? You mustn't put yourself at risk!"

"I don't care! I can't bear being separated from you forever! I can't let him rule my life."

"Even if it means your being thrown out—cast out without a penny?"

"Yes! Yes!" she cried. "I am able now to take care of myself, and I must make my own choices."

generalization—on patterns of consumerism, for example, or the need to be careful near snarling dogs. We are also able to reason toward connections between causes and effects, both in the natural world and in human actions.

This capacity to see the place of the particular within the general adds greatly to being able to understand how emotions can affect people. We might also gain a greater understanding of our own emotions as we recognize them to fall into patterns within human experience—experiences of grief, for example, or conflict.

Psychologists, professional counsellors, and psychiatrists, who know the emotional experience through study, can guide us to recognize our individual experiences. It is not necessary to be a trained professional, though, to use past experience for a better understanding of the present.

Reasoning can also help us to project consequences and to judge whether a reaction "makes sense" in its context. We might conclude we need to seek help to manage anger, for example, or to combat phobias.

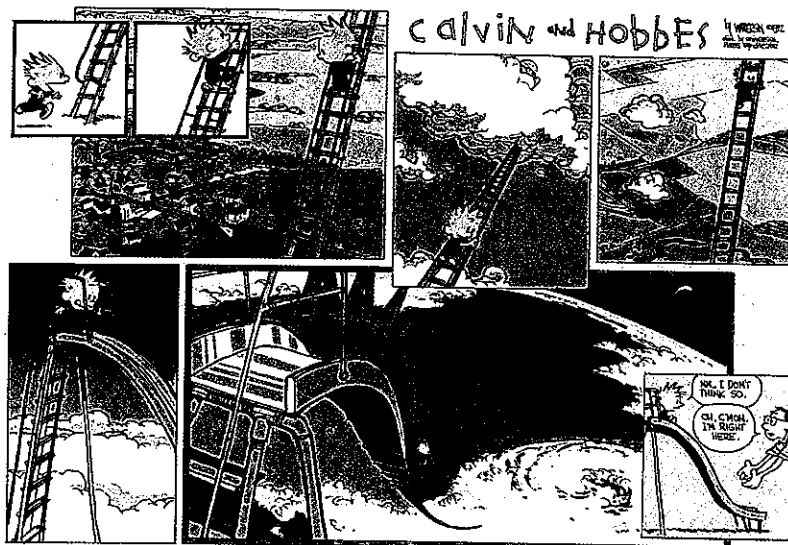
Yet the application of reasoning, considering what "makes sense" within a situation, draws heavily on our prior beliefs. At least some (and according to some authors all) emotions are cognitively dependent. For example, feeling indignation about something depends on your beliefs about what is and what is not a fair or just treatment of others. If two people's beliefs about what is fair in a given situation are very different from each other—think of a slave owner and an abolitionist, for example—they will most certainly have very different emotional responses when confronted with the situation, ranging from indifference to indignation. Other emotions much affected by beliefs include regret, remorse, and guilt.

Emotion and reasoning: opposition or balance?

At the individual and the collective level there is often an important but weighty assumption that emotion and reasoning are

You may have an opinion as to whether or not what is going on in this scene is moral or not. But stop now to concentrate on the emotions involved. If this scene is a plan for a romantic rendezvous, with both characters married to other people, what is your moral judgment not on their actions but on their feelings?

opposed to each other. In the western philosophical tradition the further assumption is that reasoning is far superior to emotion; emotion is not considered a way of knowing, but a problem to be overcome. From this point of view "emotional intelligence" appears to be nothing but an oxymoronic joke.



What does this cartoon suggest about the relationship between beliefs and emotions?

If you were Calvin, how would you go about overcoming your fear?

If you were Calvin's father, how could you go about helping him overcome it?

To what extent is it preferable to "overcome" negative emotions, and to what extent is it preferable to accept them? How would you decide?

To some extent, a suspicion of emotion seems well grounded. Emotions have a reputation for "clouding" our reasoning, preventing us from "clear" thinking when they "flood" over us. To reason clearly is to be able, potentially, to exercise control and restraint in our actions, in opposition to being "taken over" by the storm of uncontrolled emotions. Like laughter in the cinema, hatred and fear can spread to transform a crowd into a dangerous mob; anger can unleash violence and make a person a murderer; and even happy, uplifting emotions can be worked up to a crazed frenzy. Many group excesses of emotion are associated with language powerfully delivered by a demagogue, or the ideological manipulation of a leader who has "washed" people's minds.

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Chapter 4 •

"You know that Papa really will disinherit and reject you if he finds out," he countered, "just as he did me! He said he never wanted to see me again!"

"I tell you, I don't care!" she retorted. "I've missed you so much these past four years. We all have. At times I'm sure Papa misses you terribly, too, but he doesn't know how to admit it or apologize."

"Not a day goes by that I don't think of you, miss you all. It's hard to hide my feelings from Marie. I don't ever want her to feel that I regret marrying her."

"You should never have had to choose between her and your family," responded Violet firmly. "It's not her fault or yours that Papa is so prejudiced and has such a temper."

What connotations does the title of this story encourage? Is the "romantic triangle" a generalization, a stereotype, or a cliché? What's the difference?

The story twists the conventions of the "other woman", as she turns out to be Paul's sister. The twist is also a convention of plot—the surprise reversal or revelation frequent in both comedy and tragedy. If you were fooled and then surprised, what is your reaction to being tricked? Are you amused? Irritated? If you were not surprised, why not?

The sheer speed of our emotional response, too, can place it in opposition to a slower, reasoned response. There are neuronal pathways to the brain that allow certain stimuli (e.g. those that are perceived as dangerous) to shortcut the parts of the brain that think and go directly to the evolutionarily much more primitive parts of the brain, triggering an immediate fear response. That instant reaction can save us as we leap back in fear from a threatening situation, but may also cause us to misjudge the danger of the stimulus and to lash out irrationally.

However, recent research indicates that reason and emotion are much more complementary than has often been thought, and that each keeps the other in balance. The classical case of Phineas Gage (who in 1848 suffered brain damage to his frontal lobes, which prevented him both from feeling any emotion and from making any decisions)²¹ is often cited to demonstrate the close connection between our emotional and reasoning centres. Recent studies²² also indicate that many of our decision-making capabilities—from choosing food to solving mathematical problems, from forming grammatical phrases to making ethical choices—are based on emotion, possibly on the desire to maximize pleasure.

Consider for yourself the interaction between emotion and reasoning in your own life experiences with the following questions.

Would you agree with the assertion that reasoning can guide emotion?

- Recall a few instances when you were really scared or really angry. In any one of these times, did your fear or anger subside when you got more information about what was happening? (Examples: you jumped back thinking you were about to step on a snake, but it turned out to be a piece of piping; you were angry because your friend did not show up for a meeting, then found out he had a car accident on his way to meet you.)
- Have you ever been madly in love with someone you were very attracted to, but upon spending more time with him and getting to know him, you concluded that you were better off without him?

Now, let's consider the converse, and examine the assertion that emotion can guide reasoning.

- What are the criteria you are applying to choose your path after you earn your IB diploma? You might face questions such as, "Which university should I attend?" or "How many years should I give to training/education before I start applying for jobs?" Are all of the criteria you use for making the decision rational or are you also bringing in concepts such as "like", "dislike", "passion", "interest", "motivation", or "enjoy"?
- Imagine that you're not pressed for time, and are working on a research paper, a painting, a letter to a friend, a musical composition, or a video...any of which you could tinker with indefinitely. At some point, however, you decide that what you've done is good enough. Is this always a rational conclusion, or is there a feeling that tells you when to stop working on something?

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Chapter 5

They both looked up as a figure in blue approached swiftly.

"Marie!" he exclaimed joyfully, jumping up and scooping her into the curve of his arm. "Let me introduce my sister Violet."

"Violet! What a pleasure!", exclaimed Marie, smiling warmly at her. "You know, he misses you terribly—the whole family, but especially you."

"I didn't think you knew," stammered Paul.

"You never told me—in words," she smiled. "You didn't have to."

Marie says she does not have to be told how Paul feels in order to know. She understands without words. In your experience, are some people particularly gifted at understanding the feelings of others? Is empathy something you value in others, and in yourself? Is it a capacity you are born with or a skill that can be trained?

Examining the emotions behind certain collective beliefs

Some of our beliefs we can justify with a rational argument. Other beliefs we consider to be self-evident, so pervasive in our cultures that we never question them. Because within the IB we're aiming for international-mindedness, and because TOK is a course that encourages us to examine the bases for our beliefs, let us find out to what extent each of us is emotionally invested in the idea of patriotism (or more generally in the idea of loyalty for a particular group, be it national, ethnic, or religious).

The following questions are centred on identity and the characteristics you share with others in your community. They are formulated in terms of country, but should be adapted to match your own situation. If your identity is tied to a city, province, religion, ethnicity, or language, substitute one of these words for "country".

- What are your feelings about and towards your country? If you now live in a place where you were not born, how do you feel about your "new" country and about your parents' country or countries of origin?
- Do the words you used to describe these feelings have positive or negative connotations?
- Are these your feelings, which you developed independently? Or have you learned them (as you have learned the customs, manners, and language of your community)? If you say you've learned them, the implication is that feelings can be taught. Do you agree with that assertion? If not, can you resolve this contradiction?
- Do you think other people in your community have the same feelings as you do towards your country? How do you know whether they do or don't?
- If someone from another country asked you about your feelings, would you describe them in the same way as you would describe them to someone in your own country? Why or why not?
- To what extent do your beliefs and emotions depend on each other?

An interlude on happiness

by Julian Kitching

What does it mean to say you are happy? Perhaps when you say you are happy, you are talking about an emotion or feeling. Or maybe you have made a more rational assessment of the state of your life. If you say you are happy, this might be a selfish assessment insofar as you are thinking strictly about yourself; or your assessment might have taken others into account—your family, for example, or even someone you like very much. Whatever you do mean when you say you are happy, it seems justified to say that as humans we all want to be happy, and that there are certain things that we are willing to do to achieve that state. But what are those things? Consider two “thought experiments” on the importance you give happiness in your life. Your responses will be significant later in discussion of the human sciences and ethics.

The Happiness Machine

Imagine that you are presented with a special gift: a machine—the “Happiness Machine”—that can give you wonderfully positive emotions. All you have to do is hook yourself up, and switch it on. But there’s a price: once the machine is switched on, you will not remember anything that happened prior to your switching on the machine.

The key question is: do you want to switch the machine on?

NB This machine will never break down or be switched off by someone else. (This is a thought experiment, so perfection is possible.)

What did you decide, and why? Compare with classmates your responses and reasons for them. It seems that, in controlled studies, most people decide to say “no”. Why? Apparently, as humans we believe that happiness should be a product of

commendable action—we should be happy because we have done something other than directly seek happiness itself.

Perhaps you decided not to switch on because you considered that your own happiness might not be the most important thing—you probably have friends and family who should be taken into account. So your own happiness might depend on the situation of others.

Better living through chemicals?

“I drank to drown my sorrows, but my sorrows learned to swim.” (Anon.)

Imagine you have a supply of a happiness-inducing substance that can be ingested by anyone, and has no harmful side-effects. You could take it and give it to all your friends and family. Everyone would be happy. Are you prepared to do this?

In *Brave New World*, the novel by Aldous Huxley, a chemical called “soma” is legal and in common usage. Huxley describes this drug as having “all the advantages of Christianity and alcohol; none of their defects”. Could administering pleasure be considered an effective way of managing society? If you were in charge of the public water supply where you live, and had on hand the perfect drug to make people happy, would you add it to the system? After discussing your answer and the reasons for it with your classmates, don’t be too surprised to find yourself back where you started from, asking about the nature of happiness. And don’t consider yourself too odd if you reach the conclusion, as many others have before you, that happiness cannot coherently be thought of as a direct goal of life.

Over the last few decades, experimentation on substances that affect brain chemistry have led to the creation of drugs that affect some emotions we might sometimes rather avoid—pain, depression, agitation, and anxiety, to name only a few. Independent of whether you think taking medically approved drugs to modify an emotional state is a good idea or not, the fact that these drugs can work adds to the evidence of the inseparability of the brain and the body.

Moreover, MRI and PET scanners have helped researchers to see where brain activity takes place in order to explain how our minds work the way they do. Recently the orbitofrontal cortex just behind

the eyes has been identified as a part of the brain registering a lot of brain activity when we are seeking pleasure, feeling pain or generally reacting emotionally. When this part of the brain is damaged, people can lose their ability to experience emotion while still retaining their ability to reason. Ask yourself: shouldn't we want to hire people with this kind of crystal-clear logic unencumbered by emotion to work in our businesses, industries, schools, and government? Probably not. Confirming previous research, psychologist Jonathon Haidt claims that, lacking emotion, they have great difficulty functioning even in everyday life. For when people who have suffered this kind of brain damage think about what to do "they see dozens of choices but lack immediate internal feelings of like or dislike. They must examine the pros and cons of every choice with their reasoning, but in the absence of feeling they see little reason to pick one or the other."²³

Emotional education

As we grow up in a society, shaped by different influences—family, sports organizations, school systems, community groups, and religions, to mention a few—we receive guidance about what emotions are acceptable to display, and which should be kept within us. In explicit learning situations or through experiential learning, our emotions are also directed toward the "right" attitudes and actions. (Some of the factors that govern whether attitudes and actions are "right" will be considered in our discussion of Ethics in a later chapter.)

However, exactly what we are trying to educate as we expose, teach, or train carries the uncertainty over whether emotional intelligence can be measured and taught²⁴ and the familiar ambiguity of language and interpretation of culture. The current Dalai Lama (spiritual leader of Tibetan Buddhists) teaches that humans should strive for happiness. According to him the route to happiness is through loving kindness to others. He adopts a concept of the mind that does not equate to that in the west:

I believe that happiness can be achieved through training the mind... When I say "training the mind" in this context I'm not referring to "mind" merely as one's cognitive ability or intellect. Rather, I'm using the term in the sense of the Tibetan word Sem, which has a much broader meaning, closer to "psyche" or "spirit"; it includes intellect and feeling, heart and mind. By bringing about a certain inner discipline, we can undergo a transformation of our attitude, or entire outlook and approach to living.²⁵

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Chapter 6

"I'm so sorry about the way my family has behaved," said Violet, "I was afraid to meet you because I thought you'd be hostile. But if you'll accept me, I'd like to welcome you as a sister."

Marie glanced from her sister-in-law to her husband, and smiled. "Of course I always hoped that someday Paul would have his family back."

Paul beamed at both of them, his wife and his sister standing together at last.

"You've made me so happy, both of you," he exclaimed from the heart.

"I'm so very happy, too," his sister cried. "I never want to be parted from you again."

"I'm very happy for both of you," said Marie softly, "but also for myself. Now I have a sister."

And this is the end of our story. It's a happy, happy, happy ending.

They're all so happy—so they say. You might wonder whether the fact that all three of them declare themselves to be "happy" necessarily means that they are having identical emotional experiences.

An interlude on grief

Talking to Grief

Ah, Grief, I should not treat you
like a homeless dog
who comes to the back door
for a crust, for a meatless bone.
I should trust you.

I should coax you
into the house and give you
your own corner,
a worn mat to lie on,
your own water dish.

You think I don't know you've been
living
under my porch.
You long for your real place to be
readied
before winter comes. You need
your name,
your collar and tag. You need
the right to warn off intruders,
to consider
my house your own
and me your person
and yourself
my own dog.

Denise Levertov

developed, debated, modified, and applied more broadly by others since that time.

- | | |
|--------------|--------------|
| 1 Denial | 4 Depression |
| 2 Anger | 5 Acceptance |
| 3 Bargaining | |

The healer

Cultures differ in the emotions they consider to be negative (such as anger, pain, and grief), in their attitudes toward enduring them, and in the ways in which they attempt to modify or heal them. In some cultures the healer is a single figure, while in others the role may be split, for example between a spiritual healer, a physical healer (doctor) and a psychological healer.

Who knows grief better—the person who experiences it or the person who has observed and studied it? Your answer to this simple question has many implications for what knowledge is considered to be.

Are some emotions undesirable ones to be avoided, overcome, or healed, while other ones are desirable ones to be cultivated? If so, how do you determine the difference?

Both the poem by Denise Levertov and the model of the grief cycle involve, in the end, an acceptance. Is the same thing being accepted in each case? In what ways do the poem and the five-stage cycle illustrate the characteristics of literature and psychology respectively in treating emotion as (a) subject matter and (b) a way of knowing?

Find out about the medicine wheel of the Ojibway or Lakota native American cultures, with the four quarters: spiritual, emotional, physical, and mental. In attitudes toward health in either of these cultures, is it more important to be symptom-free or to be balanced? How might these two states differ?

The grief cycle

Response to death or other catastrophic news has been summed up in five stages of emotion. In 1969 Dr. Elisabeth Kübler-Ross identified these characteristic phases of grief in working with the dying, and the pattern she observed has been

The complexity of emotional education increases further as we consider what *empathy* involves. Gardner's interpersonal intelligence, the Dalai Lama's loving kindness to others, Jesus Christ's teaching to love thy neighbour as thyself, and the many similar teachings in other religious traditions all emphasize the relationship between oneself and other people. Yet one might encounter a number of difficulties in trying to be truly empathetic to others—in trying imaginatively to stand in their shoes, to see through their eyes, or to feel with their feelings. No one can be someone else and know an experience from the "inside". Working by analogy to ourselves, moreover, we are limited in the degree to which we can genuinely imagine the experiences of someone else based on our own.

When the emotional outreach crosses culture, it meets further layers of difficulty in gaps of assumptions, experiences, values, and communication. A first step in cross-cultural awareness, it has been said, is to realize that people elsewhere are really just like you. A second step, without denying the first, is to realize that they are not.

Outside the emotional comfort zone

Journalists, like other human beings, shy away from stories that make them feel uncomfortable emotions, argues journalist Susan M LoTempio. As a result, it is difficult for people in the media to cover stories of disability.

"We like to think of ourselves as consummate professionals, capable of rising above our biases and fears. But the fear of disability is so personal, so

deeply ingrained, that we must first acknowledge it before we can write the real stories."

The result, she suggests, is that disability stories tend to focus on the pity that accompanies victimization or the inspirational uplift that accompanies heroic overcoming of obstacles.

"Yes, such stories can calm fears, but they also reinforce inaccurate stereotypes and prevent journalists from digging deeper and doing better."²⁶

A third, it could be argued, is not to give up the attempt, but to watch, listen, think, and learn. When we realize the limitations of sense perception as a way of knowing, we are not likely to close our eyes and give up, but to accept those limitations and try to overcome them through further perception, possibly with the deliberate methods of an area of knowledge. Similarly, in recognizing the difficulties of empathy, if we wish to know, we do not turn away, but try to develop it further. Part of knowing through sense perception and emotion is learning how to learn.

In which of your IB subjects do you think emotion is most significant as a way of knowing—knowing your own emotions and those of others, and thereby knowing other things? To what extent is emotion part of the subject matter of your courses or the methods of the subject that lead to the content you are learning? Consider the following questions with your class group:

- What is the role of emotional response, imaginative engagement, and empathy in treating the literature of language A1? What is their role in learning a foreign language in language B?
- What role do emotions play in your group 3 subject? Are they part of the human subject matter being studied or part of the human method of study?
- In your group 4 science course and in the mathematics of group 5, to what extent have you entered an emotion-free zone? Consider the creation and communication of knowledge in addition to the subject matter.
- In your group 6 subject of art, music, theatre, film, or dance, what is the role of emotion as subject matter or method? Which of your other subjects is most like it, and most unlike it, in use of emotion as a way of knowing?

Creativity, Action, Service: reflection on emotions

In the CAS part of your IB Diploma Programme, what is the role of emotion in each of Creativity, Action, and Service?

Read the conclusions two students reached about a CAS activity that each remembered for its impact on their emotions and their ideas.

From "Chino" to "Uncle Pablo"

I went to teach children K-3rd grade in a poor area of Santiago, completely different from anything I had ever seen. One thing was to know that these areas exist, another is to be there. The first day the kids called me "Chino" [Chinese] and I felt bad that they did not respect me. Teaching them was chaotic and I did not feel that I was in a safe place. I felt insecure. After the second week the kids ended up calling me Tio Pablo [Uncle Pablo] and trusting me. They opened up to me and told me about their difficult lives. Everyone has an idea of what they think poverty is like but when you relate to poor people on this level you understand them in terms of what kind of people they are. They are just like us. There is no difference.

Pablo Lee, Korea



Walking a mile in bare feet

With a special sensitivity tightly knit to the front of my heart, I was a girl ready to embark on a mission to save the world. With this in mind I joined 79 other students to build primitive wooden homes for economically disadvantaged families who I felt needed my help. After leaving I realized that the world around them, including me, needed help. They deserved more respect and admiration than I arrived there with. I could help them through this home, but in turn, they helped me realize that life has much to offer even in the absence of material things. Walking a mile in their bare feet taught me where I wanted to head in life and the power within myself.

Nili Silverstein, Chile



With a friend or in small groups, choose one of the following questions and discuss it in the context of your school's CAS programme and your own personal experience to date. It is important that you answer the question bearing in mind specific CAS experiences, not CAS in general.

- In what ways have your emotions affected (positively and negatively) your ability to perform and to make decisions? Conversely, how have your decisions affected what you feel and think about what you are doing?
- Have your emotions changed during the time you have been involved in this activity? Have your ideas and beliefs about the people you are working with also changed, and if so, in what ways?
- In what ways can the emotions open or close avenues to understanding? In what ways can your beliefs—and the language you use to describe situations and people—do this too?

Who's in the centre?

In Chapter 1, we asked the question "Who's in the centre?" applied to your own worldview, reflecting on the terms "international" and

"internationally minded". Pause now to revisit this same question, looking back on the three ways of knowing we have treated so far.

In the following questions, you may take your "centre" to be yourself as an individual, yourself in the context of a community of knowers (e.g. your school, church, nation), or yourself in the context of all human beings. Take about 10 minutes for brainstorming, then exchange your views with others in your group.

- In what ways are you in the centre of your knowledge as you use your sense perception as a way of knowing?
- In what ways are you in the centre as you use language as a way of knowing?
- In what ways are you in the centre as you use emotion as a way of knowing?

Profit from the ambiguity of this "centre" metaphor to explore ideas.

Reasoning

Like the other ways of knowing treated in this chapter, reasoning comes so naturally to us that we rarely pay close attention to the capabilities it offers us. Yet reasoning can scarcely be separated from the thinking that we do every day in our lives.

We consider abstract ideas and symbols, and manipulate them into poems, mathematical formulae, musical scores, plays, advertisements, and political speeches. We make decisions; we set goals, and then control our actions in order to see them through. We organize, research, and plan; we solve problems on many levels, from deciding when it's safe to cross the street to building an International Space Station.

When we decide that information which we have learned in the past is pertinent to our present, we purposefully choose to recall particular memories. We select, compile, include, exclude, compare, contrast, classify, name, count, estimate, and calculate. Children as well as scientists—though with different degrees of rigour—question, put forth hypotheses and test them, seek evidence and evaluate it, analyse the results, and reach conclusions. We associate causes and effects, make correlations, and predict. When we reason, we induce, deduce, infer, generalize, specify, recognize similarities, and draw analogies. Finally, we judge, and argue endlessly about what is true, good, right, beautiful, and just...and what is not.

Abstract thinking, planning, and imagination are cognitive capabilities that constitute our human make-up. They are believed to be associated with the prefrontal cortex, a part of the neocortex that is far more developed in humans than in other primates,²⁷ and which provides researchers with countless unanswered questions. Neuroscientists, armed with tools such as positron emission tomography (PET scanning) and functional magnetic resonance imaging (fMRI), investigate the human brain to better understand how we reason²⁸ and how cognition is connected with other ways of knowing. At the opposite end of the spectrum, researchers in

cognitive computing, a new interdisciplinary field, build large-scale computer models of the brain to simulate huge numbers of neurons in the neocortex.²⁹

Reasoning and the other ways of knowing

Reasoning is closely connected with emotion, sense perception, and language. We have already discussed the idea that decision-making relies on emotion, so that fictional characters who are “all logic and no emotion” would lack far more than the ability to feel love and anger. They would also be unable to decide what food to have for lunch, unless very specific, measurable criteria (perhaps involving number of calories, nutritional content, and time necessary to consume the meal) were pre-programmed into them.

When we discussed sense perception we mentioned the Gestalt theory of psychology (see page 27), and the fact that our brains perceive visual patterns of meaningful wholes rather than collections of separate parts. Our natural perceptual tendency to group things together and to recognize patterns also directly affects the way we reason, particularly when we use induction and analogy.

Language is at the very core of reasoning. To recognize how easily and naturally you combine the ways of knowing in the reasoning process, meet the IB Genie.

The IB Genie

In legends spread through IB Lands
We find the story told
Of a genie in a magic lamp
Who turns all marks to gold.

The seven friends had heard the tale
And wished that it were true.
“Just find the IB Knowledge Lamp!
Success will come to you.”

“It can’t be true, inductively,”
Paul morosely wailed,
“I’ve tested all the lamps in town
And all of them have failed.”

“It takes just one,” Christina cried,
“To overturn your doubt.
Extend the search beyond the town!
Find the genie! Let him out!”

The seven friends searched everywhere
Till each felt quite a fool.
Abandoning the quest, they met
In the library at school.

And there between the lofty shelves,
The seven puzzled sadly,
"But could there be another way
To knowledge we want badly?"

Then eerily behind the books
Suffused a golden glow,
And from it came the husky growl,
"What do you want to know?"

"I give you wishes for a week –
I'll grant you one each day.
So take your turns and wish before
I vanish far away!"

The seven friends by accident
Had found what they did seek.
So there amidst the books at school
They planned their magic week.

The first to wish chose "eloquence"
Upon a Sunday noon
"Let others understand my thoughts!
Oh, grant this language boon!"

On Wednesday eve another friend
Chose "rationality".
"I want to understand the math
That often eludes me."

"It's talents of the heart that count,"
Another day cried Lee.
"True understanding that I seek
Consists of empathy."

After Lee had made her wish,
The next turn went to Paul,
"Athletic prowess, give me please –
Hot shots in basketball."

"I want to sing amazingly,"
Said Saturday's friend, doing trills.
Another day Maimouna begged,
"Please give me essay skills."

On Friday in the setting sun
A friend (not Sally) said,
"I'd like to understand myself,
And the confusing life I've led."

Chiara one day took a turn
 And later also Tim.
 It wasn't Tim who wished to sing
 Or know himself within.

The seven friends were jubilant
 And eager now to learn,
 With knowledge skills so granted them
 As each had had a turn.

And off they went to practise scales
 Or basketball or math—
 Or introspection, kindness, or
 Whatever was the path.

The genie snug behind the books
 Dimmed down the lamplight's glow
 And, smiling to himself, intoned,
 "What do you what to know?"

Questions

- 1 Why do you think stories that deal that deal with magic, which defies rationality, are so popular?
- 2 If your own school library had an IB genie, what form of knowledge would you wish for and why? (Should every IB library have a genie?)
- 3 What is the name given to the approach of testing many lamps and reaching a general conclusion about them? (Hint: the name you want was included in the poem.)

There is actually a puzzle embedded in "The IB Genie" poem. You will not be able to solve it in your head, but will need paper. Your task is to determine: which friend wished on which day, and for what?

Hint: Which day, according to you, is the first of the week? Which day or days are "the weekend"? Unless you make the cultural assumption that Sunday comes first, you will not be able to do the puzzle. (Being aware what you are assuming has an important role in reasoning.)

Pay attention to your process, in order to answer the following questions:

- a As you were solving the puzzle, how did you know that you'd made a mistake?
- b How did you know that you solved the puzzle successfully?
- c Concluding question: The solution of the puzzle³⁰ allowed you to know things you did not know before. How did you achieve that new knowledge? How did the approach differ from the one in question 3?

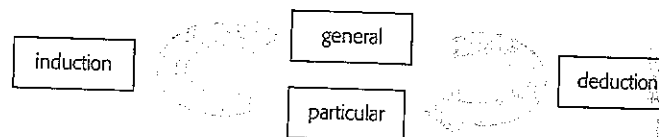
Language and reasoning

Toddlers will start using nouns such as "cookie" and "dog" as early as age one or one-and-a-half.³¹ If you have contact with toddlers, this scene might seem familiar to you. The toddler sees a large black animal, and Mummy says, "doggie" as they look at it. The toddler then sees another animal, this one brown, and Mummy says, "doggie". The next time the toddler sees a similar animal, he says, "doggie". If he has generalized correctly, Mummy confirms. If he has generalized incorrectly, Mummy corrects, "No, that's a deer." The child continues to apply language by perceiving common features and generalizing them, and connecting them to words he's hearing.

Like language acquisition, reasoning involves a continual interplay between the particular and the general. We experience the world as particular instances of things (such as faces, raindrops, and cookies), but to be able to think effectively we generalize those instances into categories to which we give names. These names—these words—are associated with our concept of the category, as well as with the common features they share (think about cookies now—what characteristics do all cookies share?). After we have developed the concept we are able to reason in the opposite direction, applying the knowledge associated with the concept to particular cases.

Having mental concepts, for example of "dog" and "cookie", allows us to live in the world without having to treat every new encounter with a dog or a cookie as unique. Even if you have never seen this particular dog or that particular cookie, you have a good idea of how to respond to both—which to bite into and which to take for a walk on a leash.

Establishing categories, naming them, and classifying are part of the inductive reasoning process: it begins with the observations we make, with information we take in through sense perceptions, and it results in a generalization applicable to all the members of the class or category.



We'll revisit this interplay between the particular and the general later in this chapter, when we discuss inductive and deductive reasoning in more detail. Now let's focus on deductive reasoning, which begins with general statements.

Playing with all, none, and some

The way a generalization is expressed is significant in understanding its breadth and its limits. Who or what are we including?

Generalizations are expressed in language with sentences that start with the word "all", for example, "all cookies are sweet". Sometimes generalizations are also expressed in sentences that start with the word "no" or "none", such as "no dogs are five-legged" or "none of the dogs is five-legged". (Can you convert these two sentences into a sentence starting with "all"?)

Independently of whether or not these generalizations are true, each makes a statement about every single cookie and every single dog in the universe (all dogs in the universe are not five-legged). How

many non-sweet cookies and five-legged dogs would we have to find in order to contradict these statements?

If you said in both cases "one", or "at least one", you were correct. One counter-example will demolish a whole generalization. Thus, sentences starting with "all", "no" and "none" are fragile statements, and should be used carefully. And watch out. The "all" doesn't need to be explicitly stated. So, if someone says, "Teenagers are self-centred", this statement refers to *all* teenagers in the world, whereas if someone says, "The teenagers in this room are self-centred" the statement includes only some of them. (Hint: you may wish to remember this when writing TOK essays.)

The words "always", "never", "everyone", "no one", "everywhere", and "nowhere" are used similarly; they also describe every single instance. What would you have to say, to contradict the following statements?

- 1 You never talk to me.
- 2 You can find this gadget everywhere.
- 3 Nobody loves me.
- 4 Everyone here is rude.
- 5 I have nothing to wear.

You might have given the following correct answers: "I talked to you *on Wednesday*", "I can't find this gadget at *the store* I like to shop at", "*Your mother* loves you", "*I'm* not rude", or "You have *that beautiful shirt*". You could also have said, "*Sometimes* I talk to you", "There are *some* stores in my town where I can't find this gadget", "*Some* people love you", "*Some* people here are not rude", and "You have *some* things to wear in that full closet of yours", and you would also have been correct.

Notice the pattern: all sentences in the second set of answers contain the word "some", which is another important word to be aware of. "Some" can stand for *any* number of cases between "all" and "none", and means "at least one". It expresses a very vague idea, as do "sometimes", "some people", and "somewhere". "Some" does not express a generalization; it refers to a particular case, or a number of particular cases.

Of course, "some" isn't the only word we use to describe the numerous possibilities between "none" and "all". For example, we could also use the expressions "a couple" or "a few" or "5.3%" or " $\frac{1}{3}$ " or "14" or "many" or "nearly everyone" or "almost all". (How do the expressions with numbers affect you emotionally? Do you shy away from them, or do you enjoy their precision?)

Let's stick with the very imprecise "some" for now. What would you have to say to contradict the statement, "Some teenagers are lazy?"

If you answered "Some teenagers are not lazy", you were wrong: you'd have to say, "All teenagers are not lazy". That vague word "some" can stand for 99.999% of instances, but it can also stand for *one single* instance of teenager laziness. In order to prove that this *one* instance isn't the case, you'd have to prove that there are no instances whatsoever of teenage laziness. Impossible, you say?

Indeed, it is very difficult to demolish sentences that start with "some". Some teenagers may be lazy and some not, without any contradiction.

Can you *negate* (a more precise way of saying "contradict", which has a very specific meaning in logic books) any statement that is thrown your way? What would you have to say to negate "All IB candidates are compassionate"? How about "all metals expand with heat", "all even numbers are divisible by two", "all politicians are trustworthy", and "all goobles are fingfangs"? Don't be concerned with whether the statement or its negation is true or false (if one is true, the other will necessarily be false). Instead, focus your attention on the form of the statement "All P is Q", and the form of the statement you've used to contradict it.

Solely from the form "All P is Q", we can immediately infer—deduce from reasoning—the form of the statement that will negate it, which is: "Some P is not Q". Every single time you see a statement in the form "All P is Q", you can negate it by asserting that "Some P is not Q".

For your own protection, do not teach these rules of negation, below, to your younger sibling. We'll use P and Q to stand for any category you like, in the same way that the variable x in algebra can stand for any number.

It is always the case that:

- 1 An "all" statement—All P is Q—is negated by a statement of the form "Some P is not Q" and vice versa.
- 2 An "all" statement—All P is Q—is negated by a statement of the form "No P is Q" and vice versa. (Which negation is easier to apply in practice?)
- 3 A "some statement"—Some P is Q—is not negated by another "some" statement, "Some P is not Q" and vice versa.
- 4 A "no" statement—No P is Q—is negated by a statement of the form "Some P is Q" and vice versa.

There are also other inferences we can make, just from the form of statements starting with "all", "none", or "some". Here's one of them:

- 5 An "all" statement—All P is Q—implies the "some" statement "Some P is Q".

Working individually, test the five rules above by replacing P and Q with words that make the "all" or "no" statements true. Compare with examples offered by your classmates. Why is "the majority rules" not a good criterion for accepting these five rules?

Validity and truth

You now know how to negate every "all", "some", and "no/none" statement that comes your way, no matter what it is referring to. The source of the statement, the context in which it was stated, and even its truth or falsehood don't matter: you are able to negate any of these statements, solely based on the form they take.

Logical implication

The term "implication" appears in criterion C of the TOK essay assessment criteria.

An implication is a logical relation between two ideas, stated in the form "A implies B" or "If A, then B".

For any valid implication, if idea A is true, then idea B cannot be false.

This powerful role of form in deductive reasoning leads to the notion of validity. Validity depends solely on the form which a statement or a chain of reasoning takes, not on its content. Thus, validity is very different from truth. Sometimes the expression “that’s logical” is used to express agreement or to convey, “that makes sense”. “That’s logical” used in this manner usually means “that’s true”, not “that’s valid”, so be aware of the ambiguity of language as you use these terms.

It is very important that we keep the terms “validity” and “truth” separate in our minds; they each have precise meanings that we’ll be building upon.

Now let us re-test the first three rules listed above, but this time replacing P and Q with words that make the “all” statements false. Do you continue to agree with the statements?

Let’s use P = men and Q = females, and examine our three statements.

- 1 “All men are females” is negated by “Some men are not females”.
- 2 “All men are females” is negated by “No men are females”.

Do these make sense? It would seem so. If a man were told, “all men are females,” he could point at himself and say, “no, I’m not”. And in this case, the false “all” statement is so absurd that even the second case—“no men are females”—could be used in practice to negate the “all” statement.

- 3 “All men are females” implies that “some men are females”.

Despite the fact that both sides of the implication are false, the implication itself is a *valid* one, as was demonstrated by your examples in the previous section when you used a true “all” statement. It continues to be valid, no matter what we are talking about.

If, however, we were to state that “Some P is Q implies that all P is Q”, this would be an *invalid* implication. The conclusion doesn’t necessarily follow. For example, “Some IB students have an IQ of 152 implies that all IB students have an IQ of 152”. The implication is invalid, for every category P and Q you may wish to consider.

Truth applies to the general and particular statements that we are reasoning about. To determine whether a statement is true or false, we need to examine its content and its meaning. We need to look at evidence, justifications, and reasons why we consider the statement to be true. We will discuss truth in Chapter 3.

Validity applies to the reasoning process. “All P is Q” implies “Some P is Q” is a valid implication. If it is true that “All P is Q” then it is also true (because it logically follows) that “Some P is Q”.

The relationship between the validity of an argument and the truth of its premises—which we will call the *key assertion of deductive reasoning*—can be stated thus:

**If the argument is valid and all premises are true,
then the conclusion *must* be true.**

Notice that this is an implication in the form "A and B together implies C". If A (the argument is valid) is the case and B (all premises are true) is the case, then, necessarily, C (the argument's conclusion is true) is the case.

We can also state this key assertion in the opposite direction:

**If the conclusion of an argument is *not* true, then either the argument
is invalid or at least one of the premises is false.**

The second form of the key assertion can be useful when you are testing arguments for validity, or checking your own writing.

The blender metaphor for validity and truth

The relationship between validity and truth is a very powerful one. A valid deductive argument enables us to derive logically, or deduce, true conclusions from true premises.

Though the conclusions are already embedded in the premises, the valid linking of the premises in the argument allows new insights to surface. Think back to "The IB Genie", and the fact that the answers to the puzzle were contained in the poem before you even read it.

Let's explore this relationship a little further. Imagine that the reasoning process is a blender, that true statements are food that is good to eat, and that false statements are spoiled food.

A valid argument is like a blender that works well. If you place fresh milk and chocolate ice-cream (true statements) in this blender for a few minutes, you will **certainly** get a delicious chocolate milk-shake (true conclusion) at the end.

If you place sour milk (false statement) into this blender, no matter how many other fresh ingredients (true statements) you include, your milk-shake will probably not taste too good (false conclusion). However, you could also end up with good food (true conclusion) at the end, such as sour-milk griddle cakes (see www.cooks.com/rec/story/121/,

or search the web for "sour milk recipe"). There is no way to know what the result will be if one of the premises is false.

There is no guarantee of success as there was above.

Finally, an invalid argument is like a blender that has a mind of its own. Anything can happen with any food you put in it. The results are so unreliable that you don't even bother to try to use the blender; you go and eat out instead.

The key assertion of deductive reasoning:

**If all premises are true and the argument
is valid, then the conclusion *must* be true.**

Validity applies to the reasoning process. If the thinking is done correctly, the argument is valid.

Truth applies to the content of the statements.

If the statements used as premises are true, and the reasoning has been done correctly, then the conclusion is also true.

If any of the statements used as a premise is false, the conclusion will be false—except in cases of lucky accidents.



When is an argument not a fight?

"Stop arguing, you two! Get along". The parental voice of the world equates an argument with a belligerent dispute. An argument in reasoning, however, is entirely peaceful. It is a clear and orderly progression from the assumptions (or premises) that we start with to the conclusions which we draw from them.

In the real world, arguments can be hidden within long paragraphs, and it may take some effort to identify their premises and

conclusion. Here are some points to pay attention to, as you attempt to analyse an argument:

- There will usually be more than two premises.
- Some premises considered obvious won't be stated explicitly.
- Words or phrases such as "because", "for", "since", "if", "when", and "in view of the fact that" indicate that what is said next is a premise.
- Words or phrases such as "therefore", "so", "then", "hence", "thus", "consequently", and "it follows that" indicate that what is said next is a conclusion.

Exercise: Find an argument in an editorial published in today's newspaper. Identify its premises and conclusion. Identify any implicit premises as well. Exchange your argument with a classmate's, and check each other's analyses.

In order to introduce you to some of the key ideas and vocabulary you will need for TOK discussion (and essay writing), we'll offer you only two very simple deductive arguments called "syllogisms". If you're interested in learning how to analyse syllogisms yourself, or pursue more complex forms of arguments, we recommend an excellent text such as Irving Copi's *Introduction to Logic*.

A very simple deductive argument with two premises (often called assumptions) and one conclusion is represented below. The line separating the premises from the conclusion is a symbol for "therefore". (Note: The terms "argument" and "assumptions" appear in criterion C of the TOK essay assessment criteria.)

Argument 1

Premise 1 (major premise)

Premise 2 (minor premise)

Conclusion

All IB Diploma candidates are geniuses.

I am an IB Diploma candidate.

I am a genius.

The major premise is a general statement and the minor premise is a particular statement. The premises attempt to support the truth of the conclusion, which connects the particular case (me) to the general categories mentioned in the first premise (IB candidates and geniuses).

If you attempted to tell people point blank, "I'm a genius, you've got to believe me!" you would probably be laughed at. If, however, you were to offer people reasons—preferably good reasons—to believe you, you would have a far better chance of making your point. Herein lies the power of reasoning as a method of justification, which we will discuss in more detail in Chapter 3.

Typically in a deductive argument, some of the premises will be general statements, and others will be particular statements. We begin from a general statement such as how things are in the world, and construct an argument that enables us to arrive at a conclusion about a particular instance.

In the context of the arguments in the editorial articles you have been analysing, take a few minutes to discuss the following questions in small groups, then come together as a class to compare answers. Read the comments below the questions only after you've had a chance to tackle and discuss them first.

- 1 Is the major premise of the argument true? How can you find out?
- 2 Is the argument valid? How do you know?
- 3 Assuming that the minor premise is true, is the conclusion true? How do you know?

Comments on question 1—How to determine if the major premise is true

Examining the truth of general statements again illustrates the interplay between general and particular which we mentioned at the beginning of this chapter. One way to check the truth of the statement would be to examine many particular cases of IB Diploma candidates and determine if each is a genius (we will discuss this inductive process later). Much more will be said about ways to investigate truth as we proceed with our exploration of TOK.

Comments on question 2—How to test the validity of arguments

As we have seen, to determine validity we need to examine the form of arguments. A valid argument follows a certain structure, order or pattern, moving from step to step, that is, premise to premise, in a correct fashion. If an incorrect "move" is made, the argument is invalid, independently of whether or not the premises are true.

Comments on question 3—In this case, is the conclusion true?

This is a valid argument, so we know, from the key assertion of deductive reasoning, that the conclusion must be true if all the premises are true.

Here's another deductive argument, this time an invalid one.

Argument 2

Premise 1 (major premise)

Premise 2 (minor premise)

Conclusion

All IB diploma candidates are intelligent.

Stephen Hawking is intelligent.

Stephen Hawking is an IB Diploma candidate.

(Stephen Hawking needn't be the famous physicist and could be the name of your pet chameleon, but either one illustrates the mistake in reasoning here.) Notice how the form of this argument differs from the first. In that one, the connection between the major and minor premise was made from the category that immediately followed "all", leading to validity. In this one, the connection was attempted with the term "intelligent", which is further from "all", leading to invalidity.

A fallacy is a mistake in reasoning such as this one. In this chapter we're discussing formal fallacies, which derive from the form the argument takes. In Chapter 4 we'll be discussing informal fallacies, which are mistakes in reasoning due to things other than form.

Exercise: Test further categories for P and Q in the following structures, which replicate the examples we discussed. Specifically, try several combinations of true and false premises with both arguments, to get a feeling for the power of the key assertion of deductive reasoning.

Argument 1 (valid)

All P is Q

R is P

R is Q

Argument 2 (invalid)

All P is Q

R is Q

R is P

Counter-arguments and counter-claims

The key assertion of deductive reasoning:

If all premises are true and the argument is valid,
then the conclusion must be true.

This key assertion states a logical implication: if the part following the "if" is the case, then the part following the "then" *must* be the case. Thus, this assertion provides us with a way to ensure—a very powerful word—that we can infer true conclusions from true premises. For example, assuming you reasoned validly while solving the IB Genie puzzle, the (assumed true for the sake of the game) information embedded in the poem allowed you to reach several new conclusions (true within the context of the game).

The key assertion also gives us two tools to counter-argue the conclusion stated in an argument:

- 1 you can counter-argue that the reasoning is invalid, or
- 2 you can counter-argue that one of the premises is uncertain, questionable, or false.

If you succeed with either tool, the original conclusion doesn't necessarily follow.

Exercise: Find another argument in the editorial section of a newspaper. What counter-arguments could you use to weaken the stated conclusion?

"Counter-claims" as used in criterion C of the TOK essay assessment criteria are similar to counter arguments, but far more interesting. Instead of your attempting to weaken someone else's argument, you attempt to weaken your own. By asking "what can be said against my argument?" and addressing its weaknesses yourself, you strengthen your argument by demonstrating that you've carefully and thoughtfully considered your own premises and chain of reasoning.

Exercise: As you watch the news on TV, keep your ears open for the use of counter-claims. You might wish to watch a news programme that goes deeper than mere “sound bites”. How do you respond emotionally to a speaker who addresses counter-claims, as opposed to one who does not?

As you write your own arguments and analyse those written by others, keep in mind that a strong argument is:

- *valid*—the form of the argument is such that the argument’s conclusion logically follows from its premises—and also
- *sound*—the argument is valid and all its premises are true.

Inductive reasoning

Where do the true general statements we use as premises in our sound deductive arguments come from?

In mathematics many of our arguments (also called mathematical proofs, based on deductive reasoning) use premises such as “All right-angled triangles have a 90° angle”. Mathematics is rife with such conventional definitions, similar to those in language. A general statement based on such a definition is easy for us to accept as true, at least for the sake of argument. However, when the statement addresses things that happen in the empirical world—things we can perceive, measure, or experiment with—it becomes a bit more complicated to arrive at a true general statement.

For each example below, consider (a) how you know the answer to the question, and (b) on a scale of 0–100%, how certain you are that your answer is true.

- 1 Will the sun rise tomorrow?
- 2 Will you eventually die?

Inductive reasoning methods are used in the natural and human sciences, and allow us to make generalizations based on observations of individual instances. Inductive reasoning is also used in areas of human endeavour such as marketing, business administration, farming, government, education, and telecommunications—pretty much in any circumstance where we need to gather data about a large number of objects, people, places, or events over time, in order to find out what happens in most cases. In the course of a normal day everyone uses inductive methods many times, even though most of us may not be consciously aware of using them.

We can be 100% certain that all future cases of a right triangle will have a right angle, because if something doesn’t have a right angle then it won’t be called a right triangle (yes, definitions are circular, by definition). In contrast, the inductive methods we will discuss here—classical induction, statistics, and analogical reasoning—will not provide us with generalizations that are applicable to all possible present and future instances, even if we often have excellent reasons to trust them despite that.

If you are disturbed by the idea of not having 100% certainty through inductive reasoning, consider the fact that you already trust

a huge number of generalizations about things in the world, about which you can have a greater or lesser degree of certainty when you apply them to a specific case. Do you take any kind of medicine? Ride in a car, bike, or public transportation? Eat any kind of processed food, or follow a nutritional plan? Follow any kind of exercise routine? If you said “yes” to any of these questions—if you don’t live under a rock, in a coma, by yourself, inside an isolated monastery—you are, in practice, already relying on a countless number of inductive generalizations. If they didn’t work, or worked so infrequently that they couldn’t be trusted, you would be very aware of them indeed.

One of our challenges with inductive reasoning is thus to decide how much we can trust the inductive generalizations about the world that we and others make. To do that, we need to take a look at how the different inductive methods operate.

Classical induction

Whereas deductive reasoning begins from a general statement, induction starts from observations. Here is a classic example of inductive reasoning:

I saw a swan and it was white
I saw a second swan and it was white
I saw a third swan and it was white

...

I saw an “Nth” swan and it was white

All swans are white (A general statement is the conclusion)

How many cases of white swans do you think you should notice before legitimately concluding that all swans are white? How many instances of sunrise do we need to see to believe that it occurs every morning, and that we can trust the sun to rise tomorrow? When we repeatedly observe instances of a particular phenomenon, it might not seem to be a tremendous leap of faith to cross the line and draw a generalization. But it is.

There is no magical number that can tell us when we have enough evidence to safely conclude with an inductive generalization of this kind. Imagine taking a voyage around the globe to observe swans. After tens of thousands of instances of white swans in Africa, Asia, and North America you arrive in the UK, take a walk in a central London park and there on the river, right before your now expert eyes, is one (just one!) black-necked swan. One false instance is enough to topple over the general conclusion you had painstakingly reached. As Bertrand Russell stated, “The man who has fed the chicken every day throughout its life at last wrings its neck instead”.³² The chicken cannot trust its experience of the inductive process, but perhaps it is humans it shouldn’t trust.

Despite not offering 100% certainty, classical induction works quite well. Much of our knowledge about the natural sciences is based on generalizations backed by repeated observation of phenomena. Some examples are objects falling to the ground with an acceleration of 9.8 m/s^2 , mitosis demonstrating specific phases occurring in a specific order, and chemical reactions consuming the same

proportions of each compound each time. Finally, no case has ever been reported of a person who hasn't died by age 123; unless a great scientific breakthrough happens soon, it is extremely likely that we too shall pass.

Activity

Consider your group 4 subject. Review some of the discoveries you have studied and in particular the generalizations that have been the result of classical induction.

Statistics

Life insurance companies exist because we believe that we are mortal. Life insurance companies thrive thanks to statistics and professionals who specialize in actuarial science. Actuaries figure out how long people in our age group (and similar to ourselves in other ways considered to be relevant to our longevity) are expected to live on average. That is an important question for life insurance companies; answering it correctly means that on average we the insured will pay the company a larger premium than they will pay to our heirs in the event of our death, which is necessary if they are to make a profit.

When we discussed the terms "all", "none", and "some", we mentioned the possibility of using numbers to describe the infinite interval between "none" and "all". Statistics does exactly that. It makes statements about an entire population using data based on a random sample. Statisticians are very much aware that they seldom have access to an entire population, and have built their science upon that premise.

Enter a random percentage in an Internet search engine, and you will find a statistical result based on that number. Examine the statements below to get a feeling for the pervasiveness of statistics in our knowledge about the world.

- Women initiate 91% of divorce.³³
- 91% of emails in India are spam.³⁴
- 82% of cancer patients report "chemo brain" during, after treatment.³⁵
- By 2009, 74% of all corporate phone lines will be VOIP.³⁶
- 56.2% of software developers use Open Source.³⁷

Each of the quantitative measures of "some" listed above comes with a story behind it (which is far more complex than the swan counter's notes, with entries such as "Monday: 21 white swans. Tuesday: 15 white swans..."). Each result is based on an experimental design (how was the random sample selected?) and on a methodology (how was the data analysed?) that need to be examined critically, to allow us to trust the results.³⁸

Statistics enables correlations to be drawn between things that are observed in the world and possible factors that contribute to their occurrence. This is crucial information to medical practice and research—drug development, cancer research, health maintenance, evaluation of surgical procedures, for example. Other academic fields

that use statistics are economics, psychology, sociology, engineering, and agricultural and environmental science. Statistics are used in the manufacturing, business, and marketing industries, as well as many others.

More than merely providing quantitative snapshots of a moment in time (for example, a future study might find that spam emails in India have decreased to 78%), statistics can go deeper. It can enable correlations to be drawn between things that are observed in the world (such as lung cancer) and possible factors that contribute to their occurrence (for example, exposure to cigarette smoke).

Numbers and statistics can convey a lot of information in a condensed form and might seem to you to be the most neutral of all possible ways of representing reality, the epitome of information in its most indisputable and bare of forms. Does this assessment stand up to your scrutiny? Or are numbers and statistics just as susceptible as the other forms of symbolic representation—maps, photographs, natural language itself—to interpretation, bias, exaggeration, and manipulation?

*Nizkor, Nizkor et achinu veachyotenu...**

by Chen Arad

Almost since I can remember myself, I can remember these few words, words that originate in a religious Jewish prayer, read every year in "Yom Hashoa", the Israeli Remembrance Day for the Holocaust. Every year, all over Israel, infants, youth, adults and elders all mention the murder of six million Jews in the Holocaust. Six million victims; this inconceivable number is emphasized time and again, specifically during this day, but all year long as well when talking about the subject, everywhere, by dedicated educators, by loving parents, by publicist media and by charismatic politicians. The consequence of this, which can be debated, is that when asked about the subject, any child will easily utter the number. Even if this will be followed by true sadness and a shed tear, a question must be asked: if this child, even if genuinely and truly sad, can really grasp the pain, sorrow, tragedy and remorse that this calamity, represented by a number, holds in it? Does his sadness truly come from a realization that six million living, unique stories with unique motives, needs and loves were systematically brought to death? To what extent are we all, experienced and educated as we may be, small children when we refer to such a complex, intriguing, yet deeply disturbing point in human history with a number?...



*The Hebrew word "Nizkor" means "we will remember".

As a critical thinker increasingly aware that ways of knowing can have an important impact on what we believe and assume to be knowledge, read the extract from a TOK essay (above) and ask yourself, as did the candidate who wrote it: "What's in a number?"

Both in the context of 20th-century history and of Jewish culture, six million is no mere number: it is shorthand for a tragedy of numbing proportions. In your mind compare for impact, precision, accuracy, detail, and truth this statistic to reading a testimony by a

Holocaust survivor, or observing a family tree marked with stars of David above the names of those who died in concentration camps. On your own or in a small group in your classroom, discuss the conclusions you reached about six million as a number. Think about the connotations of other statistics and numbers that might have been taught to you as a child, about your nation, religion, or region.

Mark Twain famously attributed to Benjamin Disraeli the remark that "there are three kinds of lies: lies, damned lies, and statistics".³⁹ When misused, distorted, and misinterpreted, this can indeed be the case with statistics. The strength of well-applied statistics, however, is that it does not attempt to generalize beyond what the data allows, and offers us a measure of that uncertainty.

Analogical reasoning

Classical induction requires that we observe very many instances, and statistics requires complex methodologies. In practice we cannot do either quickly enough when there is the need to make an immediate decision. Analogical reasoning is based on two steps:

(1) there is a recognition of similarities between two or more things, and (2) there is an assumption that if two or more things are similar in one way, they will also be similar in other ways.

If I need to buy a pair of shoes for a party on Saturday, I'm not going to choose where to shop by conducting a poll amongst my friends to determine which store is best and then statistically analyse the results, nor will I want to visit every store in town. I'm more likely to return to the store where I bought shoes a few times previously, considering that I got good wear from shoes I bought there, that prices were reasonable, and that the salespeople were helpful. I will base my decision on a few past experiences, in the hope that conditions haven't changed. Alternatively I will ask my friend, who provided me with good recommendations in the past, to recommend a shoe store now, assuming he continues to know my taste and know his stores.

You are likely to study for an exam based on the kinds of questions your teacher (or the IBO) has asked previously, in the hope that the test you take will be similar to past ones. We buy an unknown music CD or download a song by a band we enjoy, in the hope that we will also enjoy their new music. Examples of analogical reasoning abound in our daily lives.

Analogical reasoning is commonplace in medicine, especially in diagnosis. The doctor's knowledge of medicine consists to a great extent of generalizations based on statistics—"this symptom manifests itself in 72% of patients"... "this medication is effective 97% of the time, but patients who take this other drug are susceptible to..." Even though these numbers are not applicable to any individual's body in particular, it's likely that your body is similar enough to most bodies used in the study to justify the analogy. Thus the doctor is able to make an educated guess of what ails you, and prescribe a treatment that is likely to work.

Vocabulary box

inductive reasoning
deductive reasoning
analogical reasoning
creative reasoning
logical reasoning
statistics
general vs. particular
generalization
negate
counter-example
counter-claim
implication, implies
"it follows"
inference, infer
validity vs. truth
invalid
argument
premise
assumption
conclusion
conjecture

Sometimes we reason analogically not because we don't have enough time, but because we don't have enough information. For

example, some of us imagine that life may exist on other planets in other solar systems, because it exists here. These kinds of analogy provide scientists with hypotheses they can pursue. The history of science is rich with stories of new discoveries based on analogical hypotheses.

Hypothetico-deductive reasoning

Here's a fun way to observe the interplay of induction and deduction. Play the game below, or another game,⁴⁰ in class or with a group of friends.

The Crazy Captain's game

You and the other members of your group live in a small community in a cosy bay on the Pacific Ocean. Usually nothing much happens over the summer, when most of you listen to the lap-lap of the gentle waves against the shoreline from the comfort of your deck chairs near the communal docks. But today is different. Because this summer has been so hot and dry, a forest fire is spreading from the mountains towards your community.

Choose now one member of your class (or the teacher) to act as Captain of the Evacuation Boat, waiting at the docks to take you all to safety. Imagine that the Captain has assured you that you have just enough time to run home and pick up a few belongings, those that you cannot bear to lose forever to the flames. Take note, though, your Captain is quite peculiar, since she will allow you to bring on board only items that conform to a rule—a rule that only she knows. You must guess it to be able to grab quickly

your permitted personal treasure before you climb aboard.

Captain: you should now invent a rule. The rule could be based on the characteristics of the objects, on arbitrary features of the names of these (for example, items starting with S, having double letters, starting with the same letter as the name of the person proposing it). Or the rule could stipulate features of the way the proposal has to be made (with a "please") or even numerical patterns in answering (every five proposals gets a yes).

All of you should then take turns suggesting what you would like to bring, and listen to the Captain's replies. Based on the Captain's yes's and no's, your mission is to discover the rule. However, when you think you know the rule, do not shout it out. Just keep taking turns until everyone who is playing is on board ready to sail to safety.

Like natural scientists doing research on the fringes of their disciplines, when beginning this game you did not know the nature of the pattern you were seeking—the Crazy Captain could have invented any kind of rule. However, as you accumulated evidence—more and more instances of suggestions of particular items, which the Captain either accepted or rejected—you further refined your guess about the rule she had made.

The hypothetical-deductive method is a continual interplay between deductive and inductive reasoning, mediated by testing done in the real world.

The first step is inductive: based on only a few cases, you formed an initial hypothesis which was a generalization (for example, "The Captain wants on the boat only things that are good for the beach").

The second step is deductive: You chose a particular instance to test (for example, sunscreen). Think back to the valid and invalid arguments on pages 72–5. Your hypothesis served as the major premise, and the item you chose served as the minor premise. You built yourself an argument, whose conclusion you tested next.

The third step is a test of the particular instance which you chose in

Exercise

Give three examples of reasoning by analogy. How likely are you to trust your results, on a scale of 0 to 10?

the second step. You asked the Captain, “is the conclusion of the argument I constructed true or false?”

If the Captain rejected your object (false conclusion) you knew there had to be something wrong with your major premise. (Think back to the key assertion of deductive reasoning: Why is that the case?) So you had to go back to step one, and reformulate your prior generalization—or formulate an entirely new one—to use as your next hypothesis.

If, on the other hand, the Captain accepted your object (true conclusion), you went back to step two, choosing another particular instance to test. How many times did the Captain accept your object, before you were sure you’d discovered the rule? What made you feel sure you had the solution?

Perhaps what attracts people to the natural sciences is that they enjoy cracking puzzles. Your experience during this game was to some extent similar to what scientists experience as they test their hypotheses with individual cases, in laboratories around the world. Nature is a bit more reticent with its answers than the Captain was, as we shall see in Chapter 5, and there are other differences in practice which we will explore later.

Creative reasoning

As you played the game, you might have wondered if you weren’t overlooking a pattern you weren’t expecting to find. It may seem counter-intuitive that sometimes, in order to discover a logical pattern, one has to “think outside the box”, so to speak, which is quite different from deductive reasoning. Think back to how you worked on the IB Genie puzzle, or to the most recent set of maths problems you solved without a calculator. Every step must be correct, logically following from the previous steps.

In creative reasoning, however, this plodding linearity is not strictly necessary; in fact, it can be a hindrance. According to one of its main exponents, creative reasoning is “like building a bridge. The parts do not have to be self-supporting at every stage but when the last part is fitted into place the bridge suddenly becomes self-supporting”.⁴¹

In pairs or on your own, solve the mind twisters in the box below. (Don’t peek—the answers are found on page 87.)

Wrap your mind around these!

- 1 A man is found dead hanging from a rope around his neck in the centre of a room with no furniture. A small puddle is on the floor below him. He had no apparent way of hanging himself but the police declared it a suicide. Explain.
- 2 A woman had two sons who were born at the same hour of the same day of the same year. But they were not twins. How could this be so?
- 3 There are six eggs in a basket. Six people each take one egg. How can it be that one egg is left in the basket?

Question: Think of a child playing hide-and-go-seek. To what extent is he using the hypothetico-deductive method?

Creative reasoning quiz

Think, for a moment, about each of the following professionals. Assume they are extremely successful in their fields. Which of them might use creative reasoning?

- 1 a natural scientist
- 2 a mathematician
- 3 a historian
- 4 a human scientist
- 5 an artist
- 6 a lawyer
- 7 a medical doctor

The correct answer is upside down below.

Answer to the Creative Reasoning Quiz: All of them.

Classification

As we enter a discussion of how we classify our perceptions, emotions, and ideas, you will surely recognize many concepts already raised regarding grouping and categorizing. Examining sense perception, we considered the way that we associate new sensations with past ones in both involuntary interpretation by the brain and more conscious interpretation. Examining language, we considered the way words create categories for our perceptions, emotions, and thoughts, and the variability of those categories for different cultures and different communication purposes. Examining reasoning, we recognized the interplay between the general and the particular, the category and the thing within it.

Profoundly significant for what and how we know, classification merits our further attention, as it has implications in all areas of knowledge.

The following group activity invites you to consider how we classify.

Scheming to classify

In advance, designate one person to collect 12 objects with as much diversity as possible. These should be placed on a surface so that everyone can see them. Get into groups of 3 or 4 people. Each group's mission is to classify those 12 objects into categories. These are the rules:

Rule 1: Create three or four categories that will accommodate all the objects. Describe each category with the label "Things that are [...]".

Rule 2: Each category must have two or more objects (no orphans or empty categories!).

Rule 3: Each object must belong to one, and only one category (this is the difficult part!).

Rule 4: Be as creative as you can. Groups are encouraged to handle the objects in order to get the creative juices flowing.

After 15–20 minutes of discussion, each group should describe their classification scheme using a table or chart, on a medium that can be viewed by the entire class. The class then critiques each group's scheme. Among the few schemes that will survive close scrutiny (Rule 3 will usually be the killer), the scheme that best satisfies Rule 4 is deemed to be the winner. After you've done the exercise (and only after that!), continue reading below.

Imagine Carl Linnaeus in the 1730s, starting to develop his impressive *Species Plantarum* and *Systema Naturae* (kingdoms/phyla/classes/orders/families/genera/species), aimed to classify all the elements of the natural world. This was arguably the most complex problem of sense perception ever faced. He was determined to include in his classification system animals, plants, and minerals. But on what aspect of them should he focus? What should his criterion of selection be? Weight, colour, density, texture, shape, symmetry, or even smell—any of these could have qualified as important distinguishing features of the vast array of elements he meant to classify. He probably considered them all, and probably some others too. Over a period of 35 years, Linnaeus continually revised his system, including new plant and animal species. He had a significant insight about what features were important when, in the 10th edition, he decided to classify whales as mammals instead of as fish.⁴²

It wasn't just the professor's keen and observant eyes and great personal interest that were at play in the construction of this system.

Linnaeus had to use reasoning skills every step of the way. How many species do we need in a particular genus? How many genera do we need in a particular family in order to accommodate all the objects we placed in an order? Reasoning had to be used continually to test the scheme against rule 3 of the classification exercise, “Each object must belong to one, *and only one* category”. (Why is this a requirement for any useful classification scheme, by the way?)

Finally, Linnaeus was also faced with a linguistic challenge, having to find names for all the different categories he created. (His *Species Plantarum* (1753) listed approximately 8,000 plant species from around the world, while his *Systema Naturae* (12th edition, 1758) includes some 4,378 animal species.⁴³) For other people to understand and be able to use our categories, we need to name them. In turn, other people need to agree to use those names to refer to the same characteristics as we did. We have already seen that language is a conventional system of symbols—“conventional” because people agree that the word “dog” denotes that four-legged kind of creature (and not a rock or a piece of cheese), and “symbol” because a word is not the thing it symbolizes, but *stands* for that thing.

Think back to the exercise you did in discussion of language, when one person gave a word and others noted their associations. If the word was “dog”, for example, the first thought that came to your mind might have been a particular dog you know, perhaps your family dog. It is a specific dog, with an individual name, in the same way that you have a name but are also a member of *Homo sapiens*, according to Linnaeus. However, you also know the abstract concept of “dog”, which everyone who speaks English shares with you. The word “dog” represents creatures that range from the chihuahua to the English mastiff, and it is useful to a veterinarian to know that he can diagnose and treat all dog breeds similarly despite the fact that they appear to be quite different. What makes a dog a dog, or stated differently, what do all dogs have in common?

Linnaeus based his classification scheme mostly on the way things look—their shape—which is why he classified both humans and simians as “primates” (and got into trouble with the local Lutheran archbishop, but that’s another story). More recently, nucleotide sequencing has extended our perceptual tools, and is allowing scientists to refine Linnaeus’ taxonomy in quite surprising ways. Thus, classification schemes are subject to change when more information becomes available, or when objects that don’t fit into a pre-existing category are invented or discovered.

In the classification exercise you did, it is common for people to classify objects based on their uses, though also on the material from which they are made, their colour, or their usual place in a house or office. In the real world, specific industries would focus on the objects’ weights or volumes, their market prices, or their electrical conductivities, schemes that might be of interest, respectively, to shipping and moving companies, insurance companies and stores, and engineers.

Reflection: Can you think of some examples of new classes being defined, and new classification systems superseding the old? (Hint: Paying attention to new words can often provide insight into these processes.)

People, too, can be classified in numerous different ways. Just take a minute to think about it. Your school's database might classify you by your grade, age, nationality, sex, latest standardized test scores, IB Diploma Programme courses, and projected graduation year. Your doctor's office might classify you by height, gender, blood type, race, and kinds of allergies. Marketers might be interested in your household's yearly income, how many people live there, how many microwave ovens, computers and televisions are in your home, whether your parents or guardians are single or married, the highest educational level they achieved, their political affiliation, the magazines they subscribe to, and their hobbies. Think about what characteristics might be of interest to: police departments; jeans or automobile manufacturers; the military; politicians; researchers of all kinds.

Classification

Let us pause to summarize some of the ideas about classification we have considered so far in this book:

- Classification is interpretive. It is our brains that make the associations and group our experiences.
- Classification may be deliberate or not. In your classification exercise you, like Linnaeus, constructed your categories deliberately, looking for the common features. Anyone moving house, however, might doubt the deliberate nature of the category "things that belong to me".
- Classification is passed on from generation to generation by naming in language, with different languages possessing differences in their categories.
- Classification may be very specific to context, giving the people in a particular group a specialized vocabulary for their needs, whether for making cheese or for investigating sub-atomic particles.
- Classification may depend on the classifier when it comes to relationships of relative terms. Are you "international"? Are you "foreign"? Vague words such as "tall" or "strong" are also relative.
- Classification schemes exist at higher or lower levels of generality, as Linnaeus recognized as he constructed boxes within boxes. That dog you were asked to think about is boxed in multiple layers: your dog Waggles, a dog, and an animal.
- The criteria for classification, or the points of similarity, provide the system of boxing. Waggles could be grouped with brown things, your possessions, or things that need to be fed. Many classification systems may intersect for a single thing.
- Classification may be ambiguous. If you were asked to classify people by ethnic or cultural identity, what difficulties might you have, even on a very factual level? Would you have difficulty placing yourself?
- Classifications, like the words that hold them in place, have denotations and connotations. It is not always easy to distinguish between a factual category and one imbued with values. Sometimes, however, it is. Can you think of an incident of feeling insulted to hear yourself or anyone else called a -----?
- Classification may be elastic, as we saw when discussing inductive reasoning, or rigid. People may find it difficult to change their ideas in many areas of life—from having trouble modifying what belongs in the category of acceptable dress or music to being unable to absorb the unfamiliar classifications of a new scientific theory. One sub-category of a rigid classification is prejudice.

Open any of your textbooks, or think about what you memorized for a recent evaluation at school—and identify some the classification schemes involved in these cases. We are continually classifying things and ideas, in every discipline, in everything we do. Our perceptual and cognitive apparatus forces us to group the things in our physical and mental spaces, to help our brains keep track of every individual thing.⁴⁴

We need to remain aware, though, that there's nothing necessarily permanent or universal about any particular classification scheme. Classification schemes are adopted because they are considered useful by a community of knowers. When the scheme ceases to be relevant to our needs or thoughts, we may change or abandon it—though many of the traditions and idioms of our cultures may still preserve its traces.

Other classification schemes are entrenched by power or overthrown by revolution. Still others may be negotiated through courts of law: legal rulings may change the category criteria for who is entitled to certain benefits. Think for a moment of the examples you identified yourself of new verbal categories. Why did new schemes supersede the old?

A striking example is the Person's Case. In 1876, a British ruling excluded Canadian women from being considered "persons" for full participation in public life. The ruling was invoked in 1916 to attempt to disqualify the first female judge in the British Empire, in the province of Alberta. She, with other professional women similarly challenged, took their case through all levels of court, to win it finally in the British courts in 1929. The unanimous decision was that "the exclusion of women from all public offices is a relic of days more barbarous than ours. And to those who would ask why the word 'persons' should include females, the obvious answer is, why should it not?"⁴⁵

Stereotypes and prejudice

For many people throughout history there have been generalizations more difficult to challenge than this ruling on women, which at least had a legal forum. One black swan, we are told, is all it takes to overturn the generalization that "all swans are white" (page 77). Yet thousands of black people were not enough to overturn the European generalization that "all human beings are white". At the time of the African slave trade, "white" was no longer treated as part of the *description* of human beings but part of the *definition*, with the generalization closing firmly against any implications that black people should be treated in the same way as white people. (Conflicting beliefs about the slave trade, with their justifications, implications, and lingering world consequences, could make an interesting class presentation.)

Evidently, people do not always classify each other inductively, sensitive to the counter-evidence and the uncertainty of conclusions. Sometimes the classifications have already been taught, closed, and emotionally pre-judged. As we considered in discussing sense perception, people then tend to notice and confirm what they expect.

Stereotypes abound. They simplify a complex world for us and, in some contexts, create humour or effective satire. However, they also encourage us not to see the grouped people as they really are and not to recognize individual variability within the group. Thus, we may exaggerate some features of a group in a disproportionate way, see only certain features, or assume the existence of characteristics

"Categorization is not a matter to be taken lightly. There is nothing more basic than categorization in our thought, perception, action and speech. Every time we see something as a kind of thing, for example, a tree, we are categorizing. Whenever we reason about kinds of things—chairs, nations, illnesses, emotions, any kind of thing at all—we are employing categories...And any time we either produce or understand any utterance of a reasonable length, we are employing dozens if not hundreds of categories: categories of speech sounds, of words, of phrases and clauses, as well as conceptual categories. Without the ability to categorize, we could not function at all, either in the physical world or in our social and intellectual lives. An understanding of how we categorize is central to an understanding of what makes us human."⁴⁶

George Lakoff, *Women, Fire and Dangerous Things*

even if we have never noticed them ourselves. Can you think of stereotypes in your society for different groups—for dentists, or car salesmen, or feminists, or peace activists, or politicians, or businessmen, or different religious or national groups? When is a stereotype harmless? Have you ever felt insulted by stereotypes held about a group to which you belong yourself?

When the stereotype is held with negative emotion, whether felt in silence or expressed in hostile language, it has escalated into full-blown prejudice. *All those people* in that category are believed to have certain features in common—and those are undesirable ones. Unfortunately, it is painfully understandable why many groups in the world hold deep prejudices against each other, especially in regions of continuing conflict. It is very difficult to break a self-perpetuating cycle of negative images and hostile behaviour between groups who see each other as the historical enemy. Examining how perception, language, emotion, and reasoning combine to give us our beliefs about the world, however, may be one step toward understanding prejudice and setting the stage for dismantling it.

Solutions to "mind twisters" on page 82

- 1 He stood on a block of ice to hang himself, which has since melted.
- 2 They were not twins because they were two out of a set of triplets (or quadruplets).
- 3 The sixth person took their egg away in the basket.

On racism

by Vivek Bhami

First, read this passage from A.C. Grayling, *The Meaning of Things*.⁴⁷

Almost everywhere one looks among present societies, race and racism make angry welts and deep wounds on the body politic. It is an irony that although racism is a reality, and a harsh one, race itself is a fiction. The concept of race has no genetic or biological basis. All human beings are closely related to one another, and at the same time each human being is unique. Not only is the concept of race entirely artificial, it is new; yet in its short existence it has, like most lies and absurdities current among us, done a mountain of harm.

The first classification of humans into races was mooted by Linnaeus, who recognised it as a mere convenience with no basis in nature. He employed the same criteria as in his botanical classifications, namely, outward appearance, giving rise later to the simplistic typing of all humans into "Caucasoid", "Negroid" and "Mongoloid". But advances in genetics have demolished such taxonomies, by taking DNA as the criterion of classification...

In human terms DNA analysis dismantles the idea of race completely. "Race has no basic

biological reality," says Professor Jonathan Marks of Yale University; "the human species simply doesn't come packaged that way." Rather, race is a social, cultural and political concept based on superficial appearances and historical conditions, largely those arising from encounters with other peoples as Europe developed a global reach, with the slavery and colonialism that followed...

All human beings have the same ancestors. Human history is a short one; it is less than a quarter of a million years long, with the first migrations from Africa beginning half that time ago. The physical diversity of human populations today is purely a function of geographical accidents of climate and the isolation of wandering bands. The distinctions which have since been drawn between peoples are therefore arbitrary and superficial, even those relating to skin colour—for as a moment's attention shows, there is simply no such thing as "white", "black" or "yellow" people; there are people with many shades and types of skin, making no difference to any other aspect of their humanity save what the malice of others can construct...

After reading this text, discuss racism in terms of the ways of knowing studied in this chapter. How do words and their connotations, categories and classifications, metaphors and emphases affect our perception of people? Is there sufficient evidence that the notion of race is based on false premises? What upholds racist beliefs and racist policies? How does or can developing empathy and emotional intelligence combat racism? If you were a racist, is there

anything someone could do or say to open your mind? What would that be? Answer these questions (a) in the light of the excerpt above and (b) in the context of a *specific* conflict that you have studied or can now investigate, in which race was or continues to be an issue.



If you are interested in doing a class presentation on this topic, consult Chapter 7 for guidance.

Project Implicit: our hidden assumptions

During TOK class or at home as a homework assignment, go to Project Implicit's web page at www.implicit.harvard.edu. This page is composed of a series of Implicit Association Tests (or IATs). Given that people don't always speak their minds—especially in psychological tests—the purpose of IATs is to scratch beneath the surface of what we say to draw out our hidden assumptions about people who are (or we think are) different from us. As the site claims, "IAT measures implicit attitudes and beliefs that people are either unwilling or unable to report".

Take the Race IAT and then take at least one more test—you can choose from IATs on sexual preference, religion, ethnicity and age, amongst some 90 possibilities. Take note of your results on both the Race IAT and one further test to use in your class discussion.

In his book *Blink*, Malcolm Gladwell argues that our attitudes toward race, gender, and ethnicity operate on two levels. On a deliberate, conscious level, we choose to believe and adopt certain values, for example, believing that all people are born equal or that a certain group is inferior to our own. But IATs also measure attitudes on a second level, what Gladwell defines as a level of rapid cognition, "the immediate, automatic associations that tumble out before we've even had time to think". According to Gladwell, "the disturbing thing about the test is that it shows that our unconscious attitudes may be utterly incompatible with our stated conscious values."⁴⁸

Discussion of Project Implicit

- How did you react to your results? Were you surprised? Angry or hurt? Pleased? Discuss what you felt and why you think you felt what you did.
- Do you believe that your test results say something about you that you should pay attention to? Why or why not?
- Do you think that these tests are valid? When you first saw your results, did you question or accept the test's validity?
- Give examples of the cultural messages that may support attitudes linking a dominant group in your nation or culture with "good" or "superior" attributes and a subordinate group with "bad" or "inferior"

ones. Are these attitudes generalizations that can be called stereotypes? How can generalizations be distinguished from stereotypes?

- If some of our consciously held beliefs, attitudes, and values are undermined by what Gladwell calls rapid cognition (others call this intuitive thinking or even gut feelings), what do you suggest we can do to combat jumping to (false) conclusions?

Follow-up reflection

Based on what you have learnt about ways of knowing, identify as many things as you can that you and your classmates can do to combat racism. If you aren't sure where to start, try to write tips about automatic thinking, language, and generalizations.

If you are working alone or if you would prefer to do so on this occasion, you could try writing an essay with the title "My Journey with Prejudice". Include examples of prejudice that you have encountered in your life, and conscious and unconscious attitudes of prejudice that you are aware of (in yourself and/or others). Conclude by considering the avenues by which a critical thinker like yourself may overcome or tackle the roots of prejudice in your attitudes and behaviour.